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SPECIAL NEEDS EDUCATION MATERIAL
FOR VOCATIONAL AND INDUSTRIAL EDUCATION
A PLANNING GUIDE FOR VOCATIONAL TEACHERS

Developed as a Resource Guide for

Assisting the Physically Handicapped:
An Identification and Development
Of Apparatus for Laboratory Shops

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Montana State Office of Public Instruction
Vocational Education
Helena, Montana
1981

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1981

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Assisting the Physically Handicapped:
An Identification and Development
Of Apparatus for Laboratory Shops

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Kenneth L. Bruwelheide, Ed.D., 1981

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SECTION I

INTRODUCTION TO PLANNING VOCATIONAL INSTRUCTION FOR THE HANDICAPPED

INTRODUCTION TO PLANNING VOCATIONAL INSTRUCTION FOR THE HANDICAPPED

Introduction

The materials within these guidelines are designed to assist vocational education personnel in providing a wide range of educational opportunities for students with handicapping disabilities. This planning guide includes nine sections that deal with aspects of program planning and facility modification to accommodate these students in regular vocatoinal education programs. Because of the wide ranges of disabling conditions and vocational education programs, this handbook does not claim to have "all of the answers". Rather, it is a step-by-step guide for teachers and administrators who desire to make programs accessible to the handicapped individual.

Description of This Planning Guide

The goal of this planning guide is to be teacher-supportive in the area of accessible vocational education programming for the handicapped student. The content is applicable to modifying occupationally oriented laboratory programs at junior high schools, high schools, area vocational centers, community colleges, and universities. The materials and suggestions presented in this handbook should help in developing a mental attitude and physical environment that is conducive to preparing all students for work and lifelong learning.

Information and resources about program and facility modifications are included in the nine sections of this teacher's guide. The first section (Section I) introduces the topic and reviews the contents of the Planning Guide. The second section (Section II) presents Instructional Planning Guidelines for teachers to use daily. The third section (Section III) presents the concept of accessibility and presents an historic perspective. The fourth and fifth sections (Sections IV and V) make reference to specific descriptions of handicaps and their assessment. The following three sections (Sections VI, VII, and VIII) are concerned with accessibility to school

buildings, vocational labs, and equipment. The last section (Section IX) considers resources available to assist vocational teachers in programming for the physically handicapped student.

These guidelines are to be used jointly with two other information resources developed cooperatively by the Montana State Office of the Superintendent of Public Instruction, Office of Vocational Education, Helena, and Kenneth L. Bruwelheide, Department of Agricultural and Industrial Education, Montana State University, Bozeman:

Special Needs Education Material for Vocational and Industrial Education

1. A Classroom Teacher's Handbook
2. A Bibliography
3. Assistive Apparatus Plan Book

SECTION II

DAY-TO-DAY INSTRUCTIONAL PLANNING GUIDELINES FOR TEACHERS

DAY-TO-DAY INSTRUCTIONAL PLANNING GUIDELINES FOR TEACHERS

Introduction

The process of planning and developing classroom instructional and evaluation activities for special-needs students is often a confusing endeavor. This is especially true for the regular vocational area teacher who has had little or no experience or training in working with handicapped individuals. The first step in beginning the development of instruction is to answer the question "Where do I begin?"

As noted in the Classroom Teacher Handbook (Section V), it is necessary to attempt activities with handicapped students that are the same as presented to nonhandicapped students. This is a large task. Further, it is important, if not essential, that planning for these educational activities begins in advance of the handicapped student's arrival in the classroom. Advanced planning can solve or reduce many problems that often arise.

The integration of the handicapped student into the regular classroom is a shared responsiblitiy, as noted in the Classroom Teacher Handbook (Section V, p. 5-5). While school district staffing will vary, certain educational responsibilities should be carried out by qualified individuals. The following is a list of individuals who should be available to assume specific responsibilities necessary for a complete instructional program (Classroom Teacher Handbook, Section V, p. 5-5, 5-10).

School District Staff as Contributors to Education of the Handicapped

A. Regular Teachers
B. Resource Teachers
C. Intinerant Teachers
D. Self-Contained Class Teachers
E. Special Education Consultants
F. Directors of Special Education
G. Principals
H. Counselors
I. School Psychologists
J. Librarians
K. Therapists
L. Paraprofessionals

School District Staff Contributors (Continued)

M. Students

N. Parents

O. Community Volunteers

(Turnbull et al., 1979, p. 66-72)

Having provided the above individuals within their specified areas of responsibility, further planning of classroom instruction for the handicapped may begin.

Individualized Education Programs

The essence of the Education for All Handicapped Children Act of 1975 (pl 94-142) is to provide handicapped students with individualized instruction tailored to meet their unique needs. The major categories of structured components which must be carried out to accomplish this individualized instruction are as follows:

a. Statements indicating the student's present levels of educational performance.

b. Statements of annual goals.

c. Short-term instructional objectives.

d. Specific educational services to be provided to the student.

e. The extent to which the student will participate in the regular educational program.

f. The dates for initiation and projected duration of services.

g. Objective criteria, procedures, and schedules for evaluating the extent to which short-term instructional objectives are being met.

Upon examining this list, it may be noted that many of these activities are common with those attempted with nonhandicapped student instructional planning. These tasks will be conducted by the school district's Special Needs Placement Committee as noted in the Classroom Teacher Handbook

(Section V, p. 5-13, 5-14).

The Placement Committee

The Placement Committee functions as an interdisciplinary team which insures that all I.E.P. services are carried out. The National Association of State Directors of Special Education outlined the functions of the Placement Committee in the following manner:

A. Preplanning functions
   1. Specifying committee composition and procedures
   2. Gathering information needed to make decisions

B. Planning functions
   1. Developing an individual educational plan
   2. Determine eligibility for special education placement

C. Implementation functions
   1. Providing for individual program implementation
   2. Providing for individual program monitoring and evaluation

(Turnbull et al., 1979, p. 76-77)

Composition of the Committee. The regulations of P.L. 94-142 specify who will comprise the committee involved in developing the Individual Education Program and they are as follows:

a. A representative of the local educaional agency or intermediate educational unit who is qualified to provide the supervision of special education.

b. The teacher or teachers of the student.

c. The parents or guardians.

d. When appropriate, the student.

(Public Law 94-142, 1976)

When necessary, other specialists may be called upon for evaluative information such as medical or psychological specialists and legal advisors.

I. E. P. Component Review (Individualized Education Program)

As noted in the Classroom Teacher's Handbook (Section V, p. 5-14, 5-18), several major educational planning topics need to be addressed:

a. Level of educational performance,
b. Annual or long-term goals,
c. Short-term objectives,
d. Specific educational services,
e. Time allotment,
f. Setting timelines or dates, and
g. I.E.P. evaluation.

The process of developing appropriate instruction for special-needs learners does not need to be a length or complicated one, but careful attention should be paid to several important aspects. Special educator George Fair outlines the following:

a. Development of goals,
b. Selection of instructional objectives,
c. Selection and organization of content,
d. Selection of instructional procedures, and
e. Evaluation of achievement.

(Meers, 1980, p. 121)

If the aforementioned planning steps and topics are addressed in the case of each student, a concise and accurate I.E.P. will result. Furthermore, a system will be developed by those involved which will streamline the process and save time and resources.

At this point, reference should again be made to the Classroom Teacher Handbook, Sections V and VI, for more detailed background in developing instruction for the handicapped.

The I.E.P. Process--Step by Step

By examining the following forms and conducting these listed activities, local school districts and teachers should more easily be able to plan the

educational activities of each handicapped student. It is recognized, however, that professional educators in individual school districts may wish to satisfy the requirements in a manner that fits a particular system or setting. To be noted is that all activities must be conducted for each student and that a system is developed and followed.

Check List #1

Student Information Sheet

The following is confidential information--to be used for educational planning purposes only.

Student's Name: _____

Date of Birth: _____ Age: _____

Parents'/Guardians' Names _____

_____

Category of Handicap: _____

_____

Current Grade Level: _____

Specific Characteristics:

Type of Educational Program Developed:

Check List #2

School District Staff Contributing to Education of the Handicapped

Personnel	Individual is present in district and involved in I.E.P. process or services are otherwise provided--Yes or No?
A. Regular Teachers	
B. Resource Teachers	
C. Itinerant Teachers	
D. Self-Contained Class Teacher	
E. Special Education Consultants	
F. Director of Special Education	
G. Principals	
H. Counselors	
I. School Psychologists	
J. Librarians	
K. Therapists	
L. Paraprofessionals	
M. Students	
N. Parents	
O. Community Volunteers	

Check List #3

Major Components of the Individualized Education Program (I.E.P.)

Student's Name: _____ Date: _____

School: _____

The following I.E.P. activities need to be completed for the total planning process:

Activity	Completed		
	Yes	No	In-Process
A. Statement indicating student's present levels of educational performance.			
B. Statement of annual goals.			
C. Short-term instructional goals.			
D. Specific educational services to be provided.			
E. Extent to which the student will participate in the regular educational program.			
F. The dates for initiation and projected duration of services.			
G. Objective criteria, procedure, and schedules for evaluating the extent to which short-term instructional objectives are met.			

Check List #4

I.E.P. Activities Progress Report

Student's Name: _____ Date: _____

School: _____

	COMPLETED (DATE)	IN-PROCESS	NOT DONE
A. Referral of student to special education program for special services. Personnel: Special Education director, district administrator, parents.			
B. Development of the Student Mainstreaming Team. Personnel: Administrators, Special Education personnel, parents, classroom teachers, support specialists.			
C. Assessment of handicapping condition and level of educational progress. Personnel: Assessment specialists, Special Education teachers, parents, psychological/medical support personnel.			
D. Review of student abilities and limitations coordinated with available school resources. Development of academic and supportive services program. Setting of long and short range educational goals and instructional objectives. Personnel: Parents, Special Education administrators and teachers, regular teachers, evaluative personnel.			
E. Student placement and instruction program delivery. Personnel: Resource room teacher, regular classroom teacher, special services personnel.			
F. Periodic student evaluation; achievement of goals and objectives. Personnel: Classroom teacher, resource room teacher, parents, Special Education director.			
G. Continual instructional delivery.			
H. End-of-term evaluation--completed to determine if instructional goals/objectives have been attained. Personnel: Resource room teacher, regular classroom teacher, parents, support services personnel, Special Education administration.			
I. Formulation of continuing I.E.P., plus base line evaluation of past levels of performance. All personnel.			

SECTION III

INTRODUCTION TO ACCESSIBILITY

INTRODUCTION TO ACCESSIBILITY

Introduction

It should be noted that most existing educational facilities were constructed before the passage of legislation which guaranteed access to those facilities by the physically handicapped. Therefore, a problem area in educating the physically handicapped is access to the teaching facility.

The materials within this handbook are designed to assist educational personnel in providing a wider range of opportunities in vocational education for students with physical disabilities. The following sections deal with aspects of program and facility modification to accommodate these students in regular vocational education programs. Because of the wide range of disabling conditions and the wide range of vocational education programs, this handbook does not claim to have "all of the answers". Rather, it is a guide for teachers and administrators in making programs accessible to the physically disabled.

Information and resources about educational programs and facility modifications are included in the following sections of this planning guide. The goal of this planning guide is to be teacher-supportive in the area of accessible vocational education programming for the handicapped student, specifically the physically handicapped. The content is applicable to modifying occupationally oriented laboratory programs at junior high schools, high schools, area vocational centers, community colleges, and universities. The materials and suggestions presented in this handbook should help in developing a mental attitude and physical environment that is conducive to preparing all students for work and lifelong learning.

Historical Perspective

There never has been a legitimate basis for denying individuals with physical disabilities the civil rights that are available to all other Americans. These civil rights include the opportunity to participate in "normal" employment, as well as recreational, social, educational, and

political pursuits of their choosing. However, obstacles have been constructed in our environment (such as curbs, stairs, narrow doorways, etc.) that have restricted access and mobility for many disabled persons. Because these obstacles are often imbedded in the architectural design, they are commonly referred to as "architectural barriers". Architectural barriers are in many ways both the cause, and the result, of "attitudinal" barriers which tend to perpetuate the prevailing stereotypes of the disabled.

How frustrating it must be for a disabled individual to be denied participation in the mainstream of society because of the inaccessibility of buildings and facilities that were supposedly built for all people. Of course, the public often takes many things for granted, unknowingly and unintentionally denying the disabled their civil rights.

To overcome some of these problems, various actions have been taken to remove architectural barriers from existing buildings and facilities and to eliminate them in new construction. Federal laws, such as the Architectural Barriers Act of 1968 (PL 90-480), have been enacted to insure access for the handicapped to federal and federally financed buildings and facilities. Under PL 90-480, the administrator of the General Services Administration was to determine the standards for compliance with this law. He selected the American National Standards Institute (ANSI) (1961) standard A117.1-1961, Specifications for Making Buildings and Facilities Accessible to, and Useable by, the Physically Handicapped, as the standard to be met. This federal law brought some changes, but it was somewhat ineffective because it lacked strong enforcement mechanisms.

The Architectural Barriers Act of 1968 was greatly strengthened in two subsequent laws, the Rehabilitation Act of 1973 (PL 93-112) and the amendments to that act in 1974 (PL 93-516). Section 502 Of PL 93-112 established the Architectural and Transportation Barriers Compliance Board. The amendments in 1974 (PL 93-516) strengthened the authority of the Board and gave it the power to "conduct investigations, hold public hearings and issue such orders as it deems necessary to insure compliance" with the provisions of the Architectural Barriers Act of 1968.

Section 504 of PL 93-112, as amended in PL 93-516, mandated antidiscrimination against the handicapped. The assured civil rights for the handicapped could not be guaranteed without accessibility. Therefore, the rules and regulations for section 504 mandated accessibility, which meant the reduction and/or elimination of architectural barriers. In addition to the federal mandates, each state has enacted laws regarding barrier-free access.

However, once architectural accessibility to buildings is achieved, participation in vocational education programs is not guaranteed. Many pieces of equipment requisite to successful completion of a vocational course or program are not accessible to or usable by some physically disabled students. Educational furniture and equipment that has been designed for use by the non-disabled are often called "instructional barriers". Both architectural and instructional barriers must be identified and eliminated to assure access to vocational education for the physically disabled.

Description of the Accessibility Decision-Making Model

The Accessibility Decision-Making Model (Figure III-1) is presented to depict the logical sequence of steps necessary to make vocational education labs and equipment accessible to the physically handicapped. Because of the wide range of differences throughout Montana in vocational programs, school physical plants, disabling conditions of students, etc., the model allows for transportability and application to various educational settings.

The following brief descriptions of each level of the model are intended to present a general overview. Other sections of the handbook provide more detailed information about the various levels of the model.

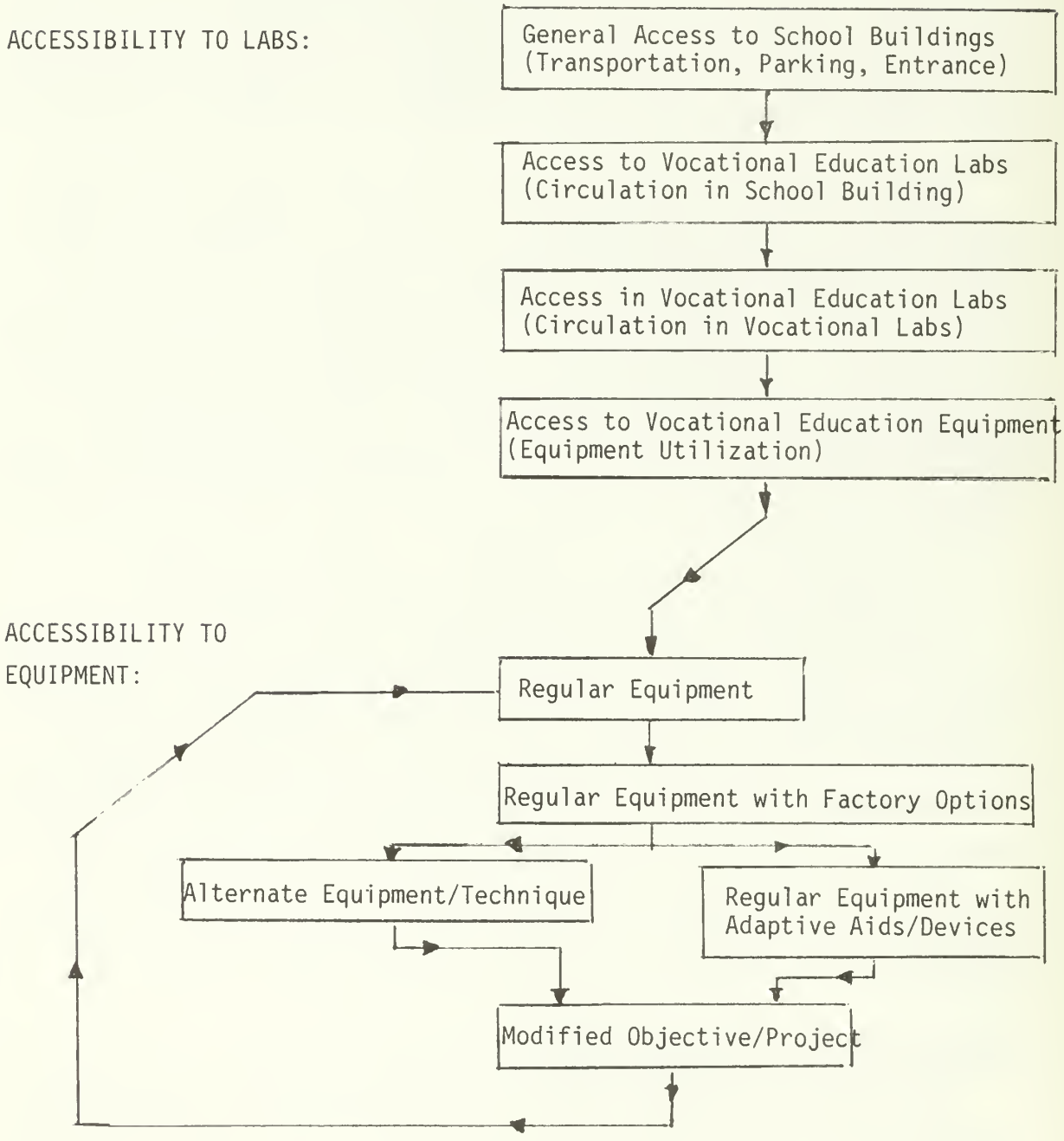
General Access to School Buildings

The physically disabled student cannot have access to vocational education if he/she does not have access or entrance to the school building that houses vocational laboratories and the other related classrooms and facilities. Therefore, the first step in the Accessibility Model is to

Figure III-1

ACCESSIBILITY TO VOCATIONAL EDUCATION LABS & EQUIPMENT:

MODELS FOR DECISION-MAKING


ACCESSIBILITY TO LABS:
General Access to School Buildings (Transportation, Parking, Entrance)
Access to Vocational Education Labs (Circulation in School Building)
Access in Vocational Education Labs (Circulation in Vocational Labs)
Access to Vocational Education Equipment (Equipment Utilization)
ACCESSIBILITY TO EQUIPMENT:
Regular Equipment
Regular Equipment with Factory Options
Alternate Equipment/Technique
Regular Equipment with Adaptive Aids/Devices
Modified Objective/Project

identify and eliminate barriers in transportation to school, parking, exterior walks and ramps, and exterior entrances. See Section VI for detailed information about general access barriers and methods to identify and eliminate them.

Access to Vocational Education Labs

After the disabled student has access and entrance to the school buildings, the next consideration in the model is interior circulation. The question is "Can the disabled student get to the vocational education laboratories?" Access in the school building to these labs, if they are on the second floor (or more likely in the basement), may require an elevator, a ramp, a chairlift, or some other procedure for mobility. Other related concerns for interior circulation include accessible lavatories, drinking fountains, cafeterias, auditoriums, etc. See Section VII for detailed information about interior circulation barriers and methods of identifying and eliminating them.

Access in Vocational Education Laboratories

After providing the disabled student with access to the vocational lab, the next consideration is entrance to and access within the lab. As an example, to gain entrance, the doorway must have a 32-inch minimum clear opening for wheelchairs. Once inside the lab, several factors such as aisle width, accessible work stations, visual and sound warning devices (i.e., fire alarms), accessible lockers, etc., must be considered. The placement of desks, tables, and/or equipment is critical for access in many instances. "Safe aisles" must allow mobility for visually impaired students and need to be wide enough to allow for wheelchairs. See Section VII for detailed information about lab layout to eliminate these barriers.

Access to Vocational Education Equipment

Once the disabled student has gained entrance to the lab and mobility throughout it, the next consideration is laboratory equipment. The model for access to equipment is depicted graphically in the lower part of Figure 1. It starts by having the disabled student use the regular equip-

ment in the lab. Use of regular equipment where possible is very important because it is regular equipment that will be available in business and industry where the disabled student will be employed. However, there are some pieces of equipment that cannot be reached and/or used safely by some disabled students (i.e., equipment designed to be used from a standing position).

However, before modifying the equipment for use by the disabled student, consider options and/or new technology that assists the students in lessening the handicapping effect of his/her disability. There are several recent technological advances which can increase disabled students' mobility and ability to use "regular" equipment and furnishings in vocational labs. The implications of these "new technology" items should be considered before making equipment modifications, since some modifications may restrict use by the able-bodied student. Of course, the cost and availability of new technology may be prohibitive for the student and /or the local educational agency. In such cases, other alternatives may be needed before many disabled students will be able to participate in a vocational program.

Where equipment needs to be adapted for use by the disabled student, the first level of modification should be a factory option. Factory options to regular equipment will be more readily available for use in vocational education and employment. Also, they do not hinder the able-bodied student. Examples of factory options include a flashing light instead of the return bell on a typewriter for use by the deaf or a light on a band saw to illuminate the cutting surface for the low-vision student.

If no factory options are available that will make certain types of equipment accessible, then there are two alternatives to consider. First, the teacher with the assistance of the student and/or other knowledgeable person might design and construct some type of adaptive aid or device to make regular equipemnt accessible. Examples include some type of jig or fixture to hold the material being workied, or perhaps a ramp and platform to raise the wheelchair student to a desirable work height.

The second option is to use an alternate piece of equipment, i.e., a

smaller version or a different piece of equipment to achieve the same results. For example, a router and router table could be used instead of a shaper, or a portable sabre saw instead of a band saw.

If neither of these options can be used to make the equipment accessible, the next step is to review the specific objectives and the reasons for requiring the use of the specific piece of inaccessible equipment. Perhaps the objective needs to be modified. For example, in an auto body program, there might be an objective stating that each student will paint a complete car. It would be difficult for a student confined to a wheelchair to paint the top of the car. Therefore, if the objective were modified to indicate that all students would be able to paint a complete product, the wheelchair student could paint small items, such as motorcycles, to learn the competencies of auto painting. To do this, the student could use the regular equipment and therefore would have access to the vocational program. See Section VIII for detailed information about making equipment accessible.

Where to Begin

Many vocational teachers raise questions about the feasibility of including physically impaired student sin their regular programs. Can they perform the required competencies? Can they use the equipment? Will they be able to find employment if they complete the program? Can I handle the student? These concerns are real, but they are not insurmountable.

The following areas of change are suggested as starting points to surmounting barriers to the physically disabled. First, each vocational teacher must do some "attitude" modification. Part of this adjustment should include an optimistic outlook on the success potential for each student with a physical disability. In other words, focus on the abilities rather than the disabilities of each student. Remember, the fact that a student is physically impaired does not mean that he/she is handicapped educationally or occupationally.

Vocational teachers need to expand their view of the range of employ-

ment possibilities in their occupational cluster. Many vocational teachers have had occupational experience near the top of their occupational hierarchy (i.e., tool and die-maker, chef, office manager, registered nurse, farm manager). Vocational teachers with these types of occupational experiences may tend to gear their programs toward the higher level jobs. While many of the higher level jobs may or may not be appropriate for the physically disabled, it should be realized that there are several related jobs that would be appropriate. Vocational education programs can and should prepare students for the job that best meets the interests, abilities, and needs of each student. For instance, a building trades program may be geared to preparing carpenters. Some physically disabled students may be able to complete the program and find employment as a carpenter (i.e., a hearing impaired student). On the other hand, a student who is confined to a wheelchair will probably have difficulty finding a job as a carpenter because of the mobility required at the construction site. This does not necessarily mean that he/she should not be allowed to enroll and participate in the program. This program may prepare the wheelchair student for employment in a prefabricated housing factory or some other related support occupation, such as a lumber company or hardware store. In these related cases, participation in the vocational program can assist the physically disabled student just as much as the able-bodies student in gaining employment.

It takes teamwork to effectively program for the physically disabled. Support from personnel in guidance, special education, rehabilitation, etc., along with student and parental support are generally required for maximum success. Therefore, vocational teachers need to become "team" players, cooperating with others for the benefit of the student.

Part of this team effort calls for effective vocational guidance and counseling. The physically disabled, just like their able-bodied peers, may have unrealistic occupational aspirations, either above or below their abilities and aptitutdes. In addition, some physically disabled students may use their disability as an excuse for not participating in aspects of

the course. To deal with such conditions, vocational guidance and counseling must take the total team approach and all members of the educational team must use their expertise together.

SECTION IV

WHO ARE THE PHYSICALLY DISABLED?

WHO ARE THE PHYSICALLY DISABLED?

Introduction

A discussion of physical disabilities by general type may seem to imply that disabled individuals can be meaningfully and adequately described with categorizing terms like "blind", "deaf", "epileptic", "diabetic", "cerebral palsied", etc. The implication suggests that once disabled persons are labelled with such terms the extent of their limitation(s) is made clear. In reality, nothing could be further from the truth. All physical disabilities may vary widely in terms of extent and severity. Each physically disabled person is first and foremost a unique individual who faces a unique challenge in the context of his or her own unique situation.

In fact, categorizing terms like those above offer nothing more than a general indication of the nature of an individual's disability. Such terms give no hint about the extent, severity, or peculiarities of an individual's condition. An accurate appraisal of any person's physical disability can only be formed in the light of competent professional diagnosis and direct contact and interaction with the individual.

This point must be stressed at the outset, before discussing general types of disabling conditions, to make it clear that categorizing disabilities for discussion purposes does not imply a similar categorizing of disabled persons. It must also be emphasized here that any of the general factors discussed as characteristics of a particular disability may or may not apply to specific individuals with that disability. And even if the general factor is present, the resulting limitation for any person can only be accurately assessed in terms of that person's manner of coping with it. For some individuals, emphasizing a related or complementary strength or asset may well compensate for a particular limiting factor. And it must also be mentioned that having one type of physical disability does not preclude a person from having or developing another. In fact, certain types of physical disabilities frequently do accompany other types, as is noted below. In such cases, the resulting condition of multiple disability may

require specialized diagnosis and specialized educational skills to serve the individual effectively.

References

General descriptions of handicapping disorders and conditions can be found in Chapter III of the Classroom Teacher Handbook. Additional descriptive references are listed in the Bibliography, Volume II.

SECTION V

ASSESSMENT OF THE PHYSICALLY HANDICAPPED STUDENT

ASSESSMENT OF THE PHYSICALLY HANDICAPPED STUDENT

Introduction

For effective educational planning and implementation, teachers must be aware of each student's abilities and level of performance in relation to the objectives and content of courses. This information should be obtained before the course begins, or as near the beginning as possible. In this way, teachers can identify students with special needs early in a course before it is too late to meet their educational needs.

Every teacher should be concerned with the following questions: Is the student prepared with the necessary prerequisites to study and learn the course content? Has the student already mastered the competencies to be taught? If so, which competencies?

These questions are the "keys" to pre-assessment. In most models of systematic instructional decision making, pre-assessment is an integral component for all students. Pre-assessment data can be collected through various means, such as standardized test scores, previous grades, teacher-made paper and pencil tests, performance tests, reviewing the student's previous work, observing the student at work, interviewing the student, interviewing the parent, etc. This information should then be used to determine the most effective and efficient path for learning.

In addition to providing a data-based guide to instruction, preassessment can be used to identify students who will probably have difficulty completing a course successfully. Those students so identified should then be assessed in more detail to determine their needs and the best way to meet them.

In many cases, physically disabled students will require an in-depth assessment and evaluation. This detailed assesment may require assistance from specialists trained in vocational evaluation. These specialists generally have expertise in giving various validated tests and interpreting data collected from them. There are two major categories of validated vocational evaluation tests--(1) psychometric tests, and (2) work samples.

Psychometrics

Psychometric tests are most generally standardized paper and pencil tests that measure interest, cognitive intelligence, psychomotor traits, etc. These tests, interpreted by trained professionals, become part of an in-depth vocational evaluation. However, caution must be taken when using these tests with some physically disabled persons. For instance, many hearing impaired and vision impaired students do not read at their grade level. In these cases, the result of the psychometric test may be less valid because the studewnts lack reading and/or writing skills.

While there has been some criticism of psychometric tests, they can be helpful in determining a student's academic skill level. If a student does not have the necessary academic skills to complete the vocational program, psychometrics may be helpful in determining areas to be remediated.

Some examples of psychometric tests are listed below. This list is not an endorsement for these particular tests nor is it intended to include all possibilities.

-- Differential Aptitude Test
-- Multiple Aptitude Test
-- Brainard Occupational Preference Inventory
-- Minnesota Vocational Interest Inventory
-- General Aptitude Test Battery
-- SRA Mechanical Aptitude Test

Work Samples

Work samples are well defined activities that simulate actual job tasks, materials, and tools for the purpose of assessing job skill potential and vocational interests. In theory, if a student can show success with a simulated sample of work, there is a high probability that the student may be successful in that occupation.

There are several validated, commercially availab le work sample systems. These systems vary in cost, content, space required, amount of training required to administer, etc. Some examples of these are listed below. Again, this list is given for purposes of example and is not

intended as an endorsement of these systems.

-- Vocational Evaluation System by Singer (VES)

-- Jewish Vocational and Employment Service (JVES)

-- The Tower System

-- Vocational Information and Evaluation Work Sample (VIEWS)

-- Valper Component Work Samples

Some of the commercial work sample systems are more applicable for the physically disabled than others. Therefore, a comparison of these systems should be conducted before purchase (se Scelfo & Micali, 1978). Also check with the local special education director or with the Department of Rehabilitation Services to see if there is an assessment lab functioning and available in your region of the state.

Teacher-Made Assessment Instruments

While in-depth formal assessment can provide a good profile of a student, some physically disabled students will not require such a detailed profile for success in a vocational program. And in some local educational agencies the services of a vocational evaluator and sophisticated testing are not readily available. Nevertheless, the vocational teacher will need some information about the physically disabled student in addition to, or as part of, the regular pre-assessment instruments and an expanded pre-assessment component in a vocational education program.

Teacher-made and/or adapted instruments can be either paper and pencil psychometric type (to determine math skillls, writing skills, reading skills, ability to follow directions, etc.), work sample type (having the student complete specified operations that simulate work required competencies), or both. These assessment instruments probably will not be "standardized" and validated. However, if they are derived from the course content and activities, they will have "face validity", and the assessment data collected will be usable by the teacher in terms of the objectives and content of the specific course.

Assessment by Interview and Observation

When assessing and evaluating the physically disabled, one of the most effective methods is to "ask" the student. Interviewing a disabled student can produce a wealth of useful information for vocational education programming.

Part of this interview can be aimed at determining the student's background experience in school and life and to assess how these experiences might pertain to your vocational course. And it can help to identify the student's likes and dislikes, occupational aspirations, current level of performance, etc.

Another part of this interview can be geared to obtaining data about the student's physical abilities and learning style. This type of information will be needed for effective vocational education programming. The following lists of questions may be helpful in structuring interview or observation sessions:

Orthopedically Impaired Students:

1. How mobile is the student?
   (wheelchair, crutches, braces, etc.)

2. How developed are fine and gross motor skills?
   (upper torso, arms, hands, and fingers)

3. How about range of motion and reach?
   (side reach, forward, up and down)

4. Does the student have strength and endurance?
   (grasp, lifting ability, etc.)

5. What work height is the best?

Visually Impaired Students:

1. How does the student read and write?
   (Braille, large print, tape recorder)

2. How well developed are the student's orientation and mobility skills? (long cane, guide dog, memory, etc.)

3. How does the student absorb information the best? (touch, descriptions, combination, etc.)

4. Is there any residual vision?

Hearing Impaired Students:

1. How does the student communicate? (speech read, sign language, both--responds orally, etc.)

2. Does the student use a hearing aid?

3. Can the student function without hearing aid? (loud machine noise may restrict use of hearing aid in lab)

4. What is the level of reading vocabulary?

An interpreter may be required when interviewing hearing impaired students. This third person may inhibit the student's response. Therefore, try to use interview techniques that are nonthreatening, positive, and focus on the student's potential success in the program. Answers to these questions can help the vocational teacher plan and/or adapt a program for the disabled student. Remember, when interviewing the student, to use discretion and to preserve the right to privacy. And remember that interviewing physically disabled students may not always produce accurate data. Some disabled students may not be totally open when discussing their disabilities. Therefore, do not rely only on an interview for your assessment.

There are several resources available for guiding and/or assisting the teacher in interviewing the student. Valpar Corporation has developed the "Valpar Physical Functioning Questionnaire". While this questionnaire is intended to be used as part of a total vocational evaluation, it can be a guide for teachers.

Assessment and evaluation of physically disabled students is an important aspect of an effective vocational education program. However, buildings, facilities, equipment, etc., also need to be assessed and evaluated.

SECTION VI

GENERAL CONSIDERATIONS FOR ACCESSIBILITY

GENERAL CONSIDERATIONS FOR ACCESSIBILITY

Introduction

In addition to an assessment of the physically disabled student, an evaluation of physical facilities is in order. Obviously, an architecturally accessible facility is mandatory if physically disabled students are to participate fully in appropriate vocational education programs. Participation involves full access to all programs, services, and activities that are provided for nondisabled students.

For a building to be accessible to the physically disabled, it must allow them to enter, to circulate and conduct their business inside, and to leave without assistance. In other words, accessibility means that physically disabled persons can function autonomously in our buildings and in our society.

General Access to School Buildings

Factors to be considered for general access to school buildings include transportation, parking, exterior walks and ramps, and entrances. Each of these factors is presented with key questions to assist the appropriate personnel in determining accessibility.

Transportation. If a physically disabled student does not have accessible transportation to and from school, he/she will not be able to participate in regular school programs. Accessible transportation can be provided in regular school programs. Accessible transportation can be provided by the school district, the parents, the student, or by public transportation.

Key Questions:

1. Is accessible transportation available?
2. Is accessible transportation provided by the school district?
3. Are the costs for use of accessible public transportation reasonable?

Parking. After arriving at school, the next consideration is accessible parking.

GENERAL CONSIDERATIONS FOR ACCESSIBILITY

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2. Is accessible transportation provided by the school district?
3. Are the costs for use of accessible public transportation reasonable?

Parking. After arriving at school, the next consideration is accessible parking.

Key Questions:

1. Are there parking spaces designated for use by the physically disabled? (At least two spaces or two percent of the total, and are they kept clear of "regular" cars?)

2. Are the designated parking spaces wide enough for car and wheelchair, allowing room for the disabled person to leave and enter the vehicle? (12'6" wide for single spaces or 20'6" for double spaces) (Figure VI-1)

3. Is the surface of the parking area smooth and firm?

4. Are parking areas free from ice and snow in the winter?

Exterior Walks and Ramps. Approaching the entrance of the school building involves considerations in site development. This includes exterior walkways and ramps.

Key Questions:

1. Are walkways provided from parking areas to the entrance?

2. Are the walkways wide enough to allow for wheelchair traffic? (5'0" wide to allow two wheelchairs to pass)

3. Are curbs and curbings provided with "cuts" or "ramps" with a negotiable slope? (1" rise for 12" run) (Figure VI-2)

4. Are low-hanging tree limbs and other overhead obstructions removed to prevent injury to the visually impaired?

5. Are ramps and walks cleared of ice and snow in winter?

Entrances. How frustrating it must be for a disabled person to approach the school building only to find that he/she cannot enter because the entrance is not accessible.

Key Questions:

1. Are the door openings at least 32" in clear width?

2. Do the doors require an abnormal amount of strength or manipulation to open?

3. Are the approaches on both sides of the door large enough to maneuver a wheelchair while opening the door? (Figure VI-3)

4. Is the door handle at an appropriate height?

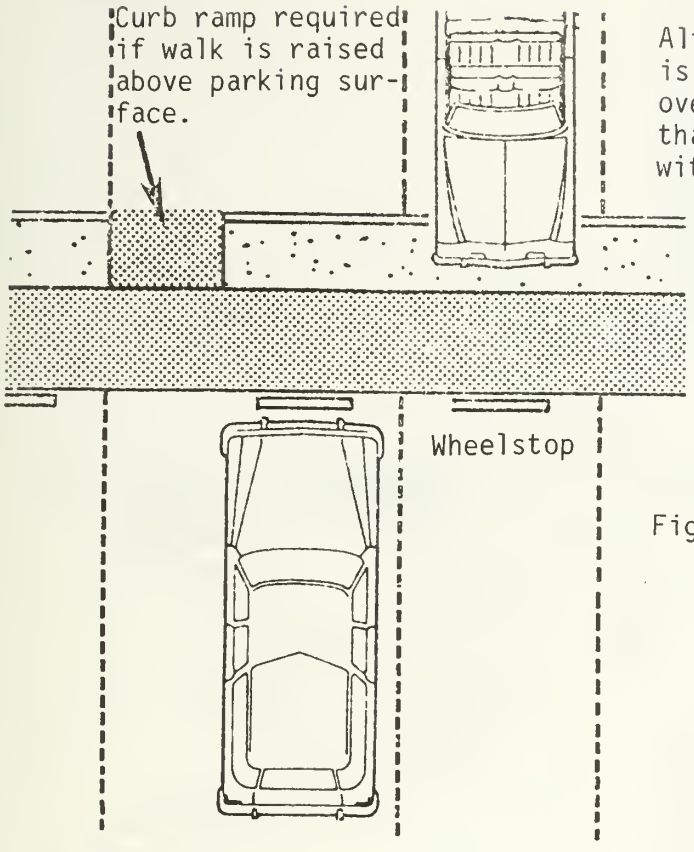
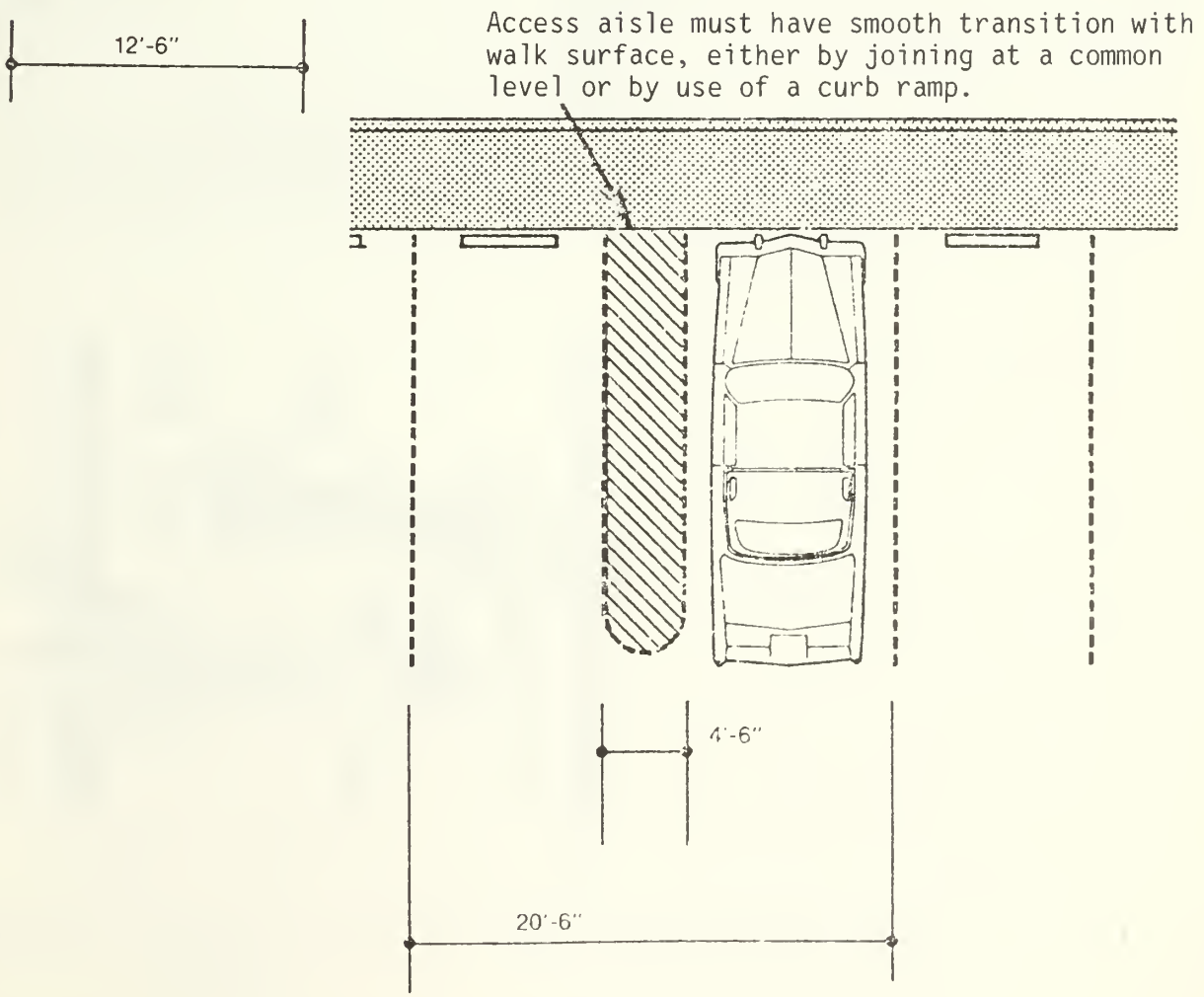

Curb ramp required if walk is raised above parking surface.
Alternative to wheelstops is to provide sufficient overhang space for car so that is doesn't interfere with circulation.
Wheelstop

Figure VI-1. Accessible parking spaces include enough width to allow the car door to fully open for exit from/entrance to vehicles by individuals with wheelchairs.


12'-6"
Access aisle must have smooth transition with walk surface, either by joining at a common level or by use of a curb ramp.
4'-6"
20'-6"

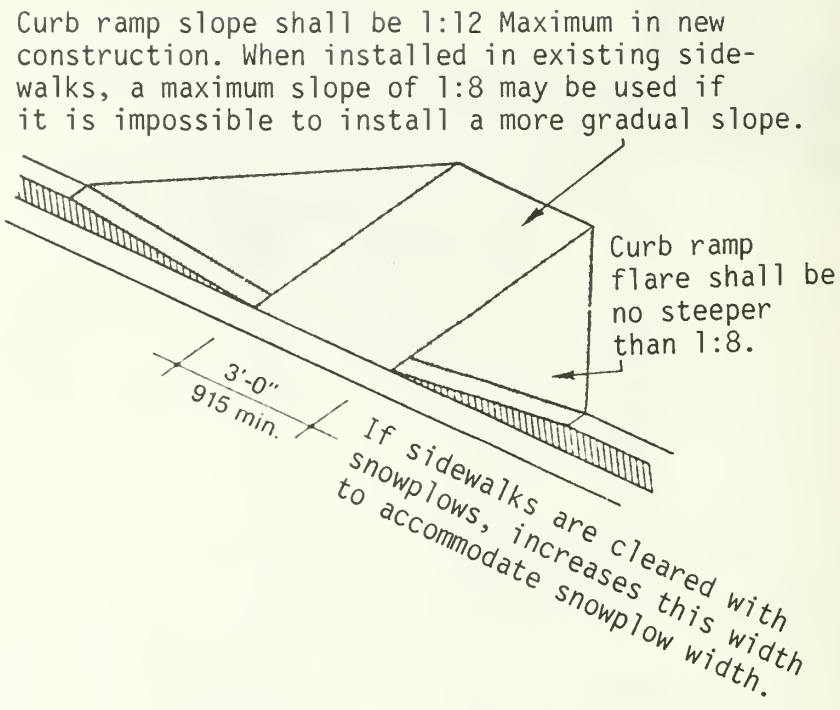
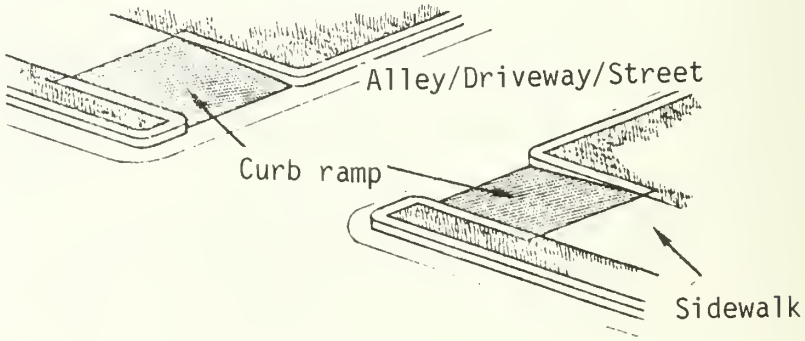

Curb ramp slope shall be 1:12 Maximum in new construction. When installed in existing sidewalks, a maximum slope of 1:8 may be used if it is impossible to install a more gradual slope.
Curb ramp flare shall be no steeper than 1:8.
3'-0" 915 min.
If sidewalks are cleared with snowplows, increases this width to accommodate snowplow width.

Figure VI-2: Curb cuts increase mobility for individuals in wheelchairs, but if they are not well planned they can hinder mobility for the blind.



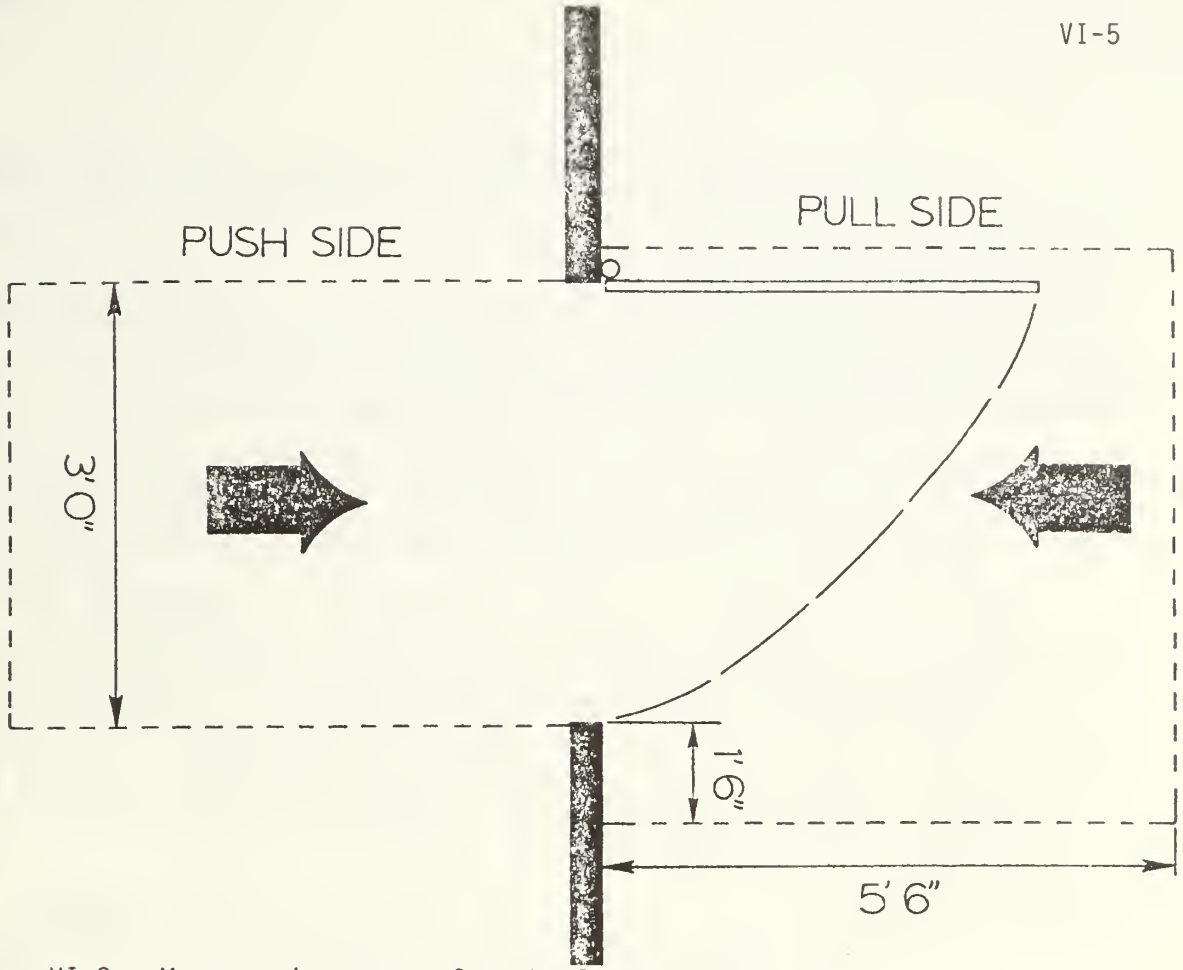


Figure VI-3: Maneuvering space for wheelchairs needs to be provided on both sides of doors.

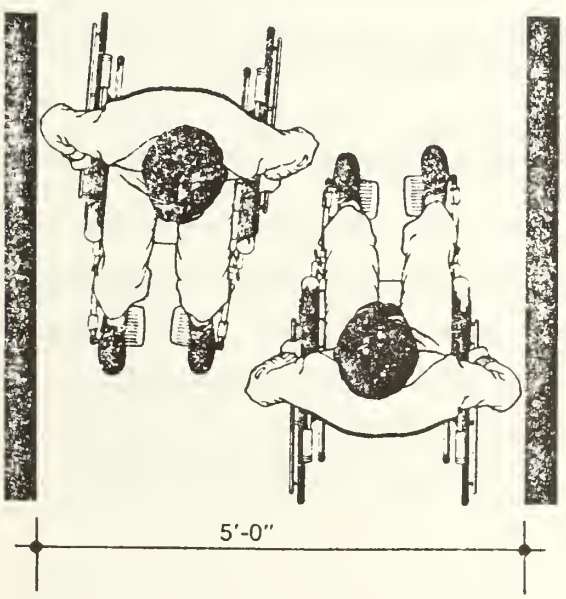


Figure VI-4: Hallways must be 5'0" side to allow two wheelchairs to pass.

5. Is the threshold flush with the floor on both sides of the door?

Access to Vocational Education Labs

Once the physically disabled student has entered the school building, his/her circulation in the building and use of the necessary facilities must be considered for effective educational programming. Interior circulation and building use relates to hallways and stairways, toilet rooms, drinking fountains, signage, etc. Each of these factors are discussed briefly and key questions are listed for consideration and evaluation.

Hallways and Stairways. Traffic patterns must be considered in planning access to all required rooms and facilities in the school building. Traffic patterns may be complicated for many physically disabled students because ofmulti-level buildings, fire doors, stairwells, etc. Also, accescible trafffic paterns must be provided for emergency exit in case of fire or some other potential disaster.

Key Questions:

1. Are the hallways wide enough to allow two wheelchairs to pass? (5'0" minimum) (Figure VI-4)

2. If there are multiple levels in the building, are elevators, ramps, or lifts provided?

3. If there are stairs, are they designed for access with appropriate handrails, dimensions, and nosings?

4. If there are elevators, are the controls reachable from wheelchairs and are they marked in braille?

5. Are hallways waxed and highly polished? (This may increase the possibility of falling for the visually impaired.)

Drinking Fountains. The use of drinking fountains is not just a convenience for many physically disabled persons. Many persons confined to wheelchairs need to increase their intake of fluids for good health. These people often have their body excretory functions adversely affected because they are continually sitting and immobile. Therefore, persons confined to wheelchairs need to increase fluid intake to dilute urine and

help prevent kidney stones and urinary tract infections. These types of infections are a major cause of death for many paraplegics and quadriplegics.

Key Questions:

1. Are drinking fountains on accessible areas of the building?
2. Are drinking fountains placed at height equipped with controls that are usable from a wheelchair? Or, are cups provided?

Toilet Rooms. Because of the need for increased fluid intake and for the convenience of the physically disabled student, toilet rooms must be accessible.

Key Questions:

1. Is there an accessible restroom for each sex on each floor?
2. Is there at least one stall in each restroom that will accommodate a wheelchair?
3. Are sinks, faucets, towels, mirrors, and soap dispensers reachable and usable from a wheelchair?

Signage. Interior circulation in schools can be hindered if signs and numbers are not accessible.

Key Questions:

1. Are signs and room numbers provided to communicate necessary information to all students?
2. Are signs and room numbers made with raised figures and contrasting color backgrounds?
3. Are all signs and room numbers placed in locations that are consistent throughout the building and at an accessible height?
4. Do signs include the name of the lab to help orient the student?

Other Factors. There are other factors that need consideration for accessible interior circulation. These include visual and sound alarm systems, telephones, auditoria, cafeterias, libraries, etc. Vocational education programs are not the only programs in the school that require access for successful programming.

Accessibility Survey

The Capital Development Board of the State of Illinois has developed an accessibility compliance checklist and evaluation form (Form No. AC-1). This checklist coincides with the state codes for access, Accessibility Standards Illustrated.

To evaluate your school in terms of accessibility, the following steps are recommended:

1. Read and become familiar with the requirements presented in Accessibility Standards Illustrated.
2. Complete the evaluation questionnaire, noting areas and/or conditions that are not in compliance.
3. Compile a list of inaccessible items/areas for further study.
4. Make recommendations to remove and eliminate access barriers.
5. Remove and eliminate access barriers.

There are several resources to assist school personnel in completing the accessibility checklist. These include hiring professional architects, using consultants from the Montana State Office of the Superintendent of Public Instruction, involving vocational architectural drafting students, etc. No matter which resource(s) used, the outcome goal should be accessibility.

BUILDING EVALUATION FORM
FOR
ACCESSIBILITY FOR THE HANDICAPPED

NAME OF BUILDING _____ CDB PROJECT NO. _____

STREET ADDRESS _____ CITY _____

EVALUATOR _____ % REVIEW _____ DATE _____

STD. REF.	ITEM	YES	NO	CODE	REMARKS
3.5	PARKING				
3.5.9 3.5.2	1. Are there designated and marked accessible stalls close to building?			1	
3.5.4	a. If yes, are the stalls a min. 12'-6" wide or 20'-6" for 2 adjacent stalls?			2	
3.5.5	b. If yes, is there a min. of 2 or 2% of total up to 400 or 8 + 1% of total over 400?			3	
3.2.2 3.2.3	2. Is the parking area surface firm and smooth?			4	
3.2	EXTERIOR WALKS AND RAMPS				
3.1.1	1. Is there a walk from parking area to the major entrance?			5	
3.2.1	a. If yes, it is a minimum of 5'-0" wide?			6	
3.2.2	b. If yes, is it free of curbs or if curbs exist are there curb ramps?			7	
3.2.4	2. Do all slopes heve a rise of less than 1-20?			8	
6.1.5	a. If no, do any rise more than 9"?			9	
6.1.1	b. If no, do they have level rest areas according to Section 6.1.1?			10	
6.3	c. If yes to 2a, are there handrails according to Section 6.3?			11	
3.2.6	3. Are all cross slopes less than 1-50?			12	
3.2.2	4. Are the surfaces of all walks and ramps firm and smooth?			13	
3.2.9	5. Is the path area free of hazards or are the hazards identifiable?			14	
3.2.8	6. Are they level at doors and do they extend a min. of 1'-6" past pull side of door?			15	
3.2.7	7. Are they free of gratings or if gratings exist, are the slots 3/8" or less in width and in the direction of travel?			16	
4.1	DOORS				
4.1.3	1. Do all entry, exit and passage doors heve a minimum clear opening width of 2'-8"?			17	
4.1.5	2. Is the space between doors in series a min. of 4'-0" plus the width of one door?			18	
4.1.5	3. Do both doors in series open in same direction?			19	
4.1.1	4. Is the floor level a distance of 4'-0" or more on push side of door?			20	
4.1.1	5. Is the floor level a distance of 5'-0" or more on pull side of door?			21	

STD. REF.	ITEM	YES	NO	CODE	REMARKS
4.1.1	6. Are walls on pull side of doors at least 1'-6" from jamb?			22	
4.1.12	7. Is the bottom rail of all doors a minimum of 10" high?			23	
4.1.10	8. Are all thresholds a maximum ½" high or less?			24	
4.2.1	9. Is all opening hardware mounted 3'-0" to 3'-8" high?			25	
4.2.6	10. Is hardware knurled or have applied abrasive on fire exits, emergency, and doors to hazardous areas?			26	
5.1	INTERIOR CIRCULATION				
5.1.4	1. Do all corridors have a clear path 5'-0" wide or more?			27	
5.1.6	2. Do all corridors have a clear height of 7'-6" or more?			28	
5.1.1	3. Is there access to all areas without stairs, ramps or elevators?			29	
	4. If no to 3, are there stairs? If yes to this, answer the following:			30	
6.2.1	a. Are the risers 7" or less?			31	
6.2.1	b. Are the treads a minimum of 11" wide?			32	
6.2.3	c. Are the risers free of square edged nosings?			33	
6.2.6	d. Are there handrails 2'-6" to 2'-10" high and at 2'-0" if school is elementary?			34	
6.2.6	e. Does the handrail extend 1'-0" past the top and 1'-0" + one tread past bottom?			35	
6.3.7	f. Is there a tactile star on top of railing at main exit?			36	
6.2.10	g. Is there a barrier under bottom flight of stairs if occurring in a circulation path?			37	
	5. If no to 3, are there ramps? If yes to this, answer the following:			38	
6.1.1	a. Are any slopes greater than 1:20?			39	
6.1.5	b. Do ramps that rise more than 9" have handrails on both sides?			40	
6.1.5	c. Are the handrails 2'-6" to 2'-10" high and at 2'-0" if school is elementary?			41	
6.1.8	d. Does the maximum rise of slopes comply with Table 6.1.1?			42	
	6. If no to No. 3, is there an elevator? If yes to this, answer the following:			43	
7.1.10	a. Is the door and cab accessible?			44	
7.1.6	b. Are there visual and audible signals: Up – white, one ring; Down – red, two rings?			45	
7.1.5	c. Is call button maximum 3'-6" above floor?			46	

STD. REF.	ITEM	YES	NO	CODE	REMARKS
7.1.4	d. Is there tactile floor designation on each jamb?			47	
7.1.14	e. Are controls mounted with highest button max. 4'-6" above floor and emergency button max. 2'-11" above floor?			48	
7.1.17	f. Is there an emergency telephone mounted in cab, max. 4'-0" above floor?			49	
7.1.15	g. Are there car position indicators?			50	
7.1.14	h. Are there tactile floor numbers beside floor buttons?			51	
7.1.16	i. Are there handrails on side walls of cab 2'-6" to 2'-8" high?			52	
6.3.9	7. Is there any unenclosed floor opening, landing, or balcony? If yes, answer following:			53	
6.3.9	a. Do unenclosed floor openings or landings have a guard rail 3'-6" min. height?			54	
6.3.9	b. Do balconies have a guardrail minimum 2'-2" high?			55	
8.1	TOILET ROOMS				
8.1.7	1. Is there at least one stall in each restroom 5'-0" x 5'-0" (Fig. 8.1.7) or 3'-0" wide (page 195)?			56	
8.1.9	2. Is there min. 2'-6" clearance under lavatory with water supply insulated if water above 105 degrees F.?			57	
8.1.10	3. Does lavatory have faucet that is operated by lever action?			58	
8.1.12.	4. Is there one urinal in each men's room with elongated lip max. 1'-5" above floor?			59	
8.1.13	5. Is the bottom edge of one mirror maximum 3'-2" above floor?			60	
8.1.14	6. Are all dispensers mounted maximum 3'-4" above floor to highest operable part?			61	
9.1	DRINKING FOUNTAINS				
9.1.1	1. Are there drinking fountains in accessible areas?			62	
9.1.2	2. Is the orifice max. 3'-0" high or max. 2'-6" if school is elementary?			63	
9.1.4	3. Does the control have lever action to operate?			64	
10.1	SHOWER ROOMS				
	1. Are showers provided? If yes, answer the following:			65	
10.1.1	a. Is there one stall min. 3'-0" x 3'-0" according to figure 10.1.1 for each sex?			66	
10.1.2	b. Are gang showers available without curbs?			67	
10.1.4	c. Are water controls single lever?			68	
10.1.6	d. Are soap dispensers mounted a max. 3'-4" above floor?			69	
10.1.5	e. Is the max. water temp. 105 degrees F. or less?			70	

BUILDING EVALUATION FORM
FOR
ACCESSIBILITY FOR THE HANDICAPPED

STD. REF.	ITEM	YES	NO	CODE	REMARKS
12.1	SIGNAGE				
12.1.1	1. Are tactile signs provided for room use, corridor and location identification?			71	
12.2	EMERGENCY WARNING SIGNALS AND ALARMS				
12.2.1	1. Are both visual and audible signals and alarms provided?			72	
12.2.5	2. Are fire alarm activating controls mounted between 3'-4" and 4'-0" above floor?			73	
11.1	TELEPHONES				
11.1.1	1. Is highest operable part max. 4'-6" high with side access, 4'-0" high with front access.			74	
15.1	APPLIANCES				
15.1.1	1. Is the highest operable part 3'-4" to 4'-0" above floor?			75	
16.3	SPECIAL EQUIPMENT				
16.3.3	1. Are 2% of lockers not over 4'-0" high with 3'-6" clear access in front?			76	
16.3.5	2. In each lab, is there one station with clear space under 2'-6" high, 3'-0" wide, 2'-0" deep?			77	
16.3.6	3. Are aisles, between library stack areas a minimum of 3'-6" wide?			78	
16.7	AUDITORIA, ASSEMBLY HALL, STADIA				
16.7.1	1. Is there an auditorium, assembly hall or stadium? If yes, answer the following:			79	
16.7.1	a. According to all previous standards are all areas accessible?			80	
16.7.2	b. Are there special seats and wheelchair spaces according to tables 17.7.2, 16.7.6, and 16.7.7?			81	
16.8	SERVICE COUNTERS				
16.8.2	1. Is there a place at all service counters which is 3'-0" above floor?			82	
16.8.4	2. Is the clear space in front of all counters at least 2'-8" wide?			83	
16.9	CAFETERIAS				
16.8.3	1. Is the tray sliding counter a max. of 3'-0" above floor?			84	
16.9.2	2. Do tables have a min. 2'-6" clearance under top?			85	
16.9.3	3. Is the clear space between chairs a min. of 3'-0"?			86	

SECTION VII

ACCESSIBILITY IN VOCATIONAL EDUCATION LABS

ACCESSIBILITY IN VOCATIONAL EDUCATION LABS

Introduction

Once the physically disabled sutdent has access to and mobility throughout the school building, the next area of concern is entrance to and circulation in the vocational education lab(s). Considerations for laboratory planning and layout are crucial in terms of accessibility to vocational education programs for the physically disabled.

Entrance

To provide entrance to a lab, doorways must have at least a 32" wide clear opening to allow for wheelchair entrance. In addition, the hall or approach area to the doorway must allow enough space to maneuver a wheelchair while opening the door. This means a minimum of 3'6" on the push side of the door and 4'0" on the pull side of the door (Figure VII-1).

Entrance doors to labs must havea glush, smooth surface on the bottom ten inches (i.e., a smooth kickplate). If doors do not have this, footrests on wheelchairs may get caught against the door styles and/or panels (see Section 4.1.12., Accessibility Standards Illustrated) (Figure VII-2).

Thresholds should be flush with the floor surface where possible to allow for safe crossing by wheelchairs and by the visually impaired. Where they are not flush, the maximum height allowed is $\frac{1}{2}$" and they must be beveled to allow wheelchairs to cross.

Door handles should be designed to be usable without requiring great force or manipulation. The placement of door handles in relation to distance from the floor should also be considered.

Another aspect of entrance relates to room identification and signage. Room numbers and/or signs must have raised letters (at least 1/32") that are a minimum of 5/8" in height and must have a sharply contrasting background color. They should be located on the latch side of the door, 4'6" to 5'10" from the floor (Figure VII-3).

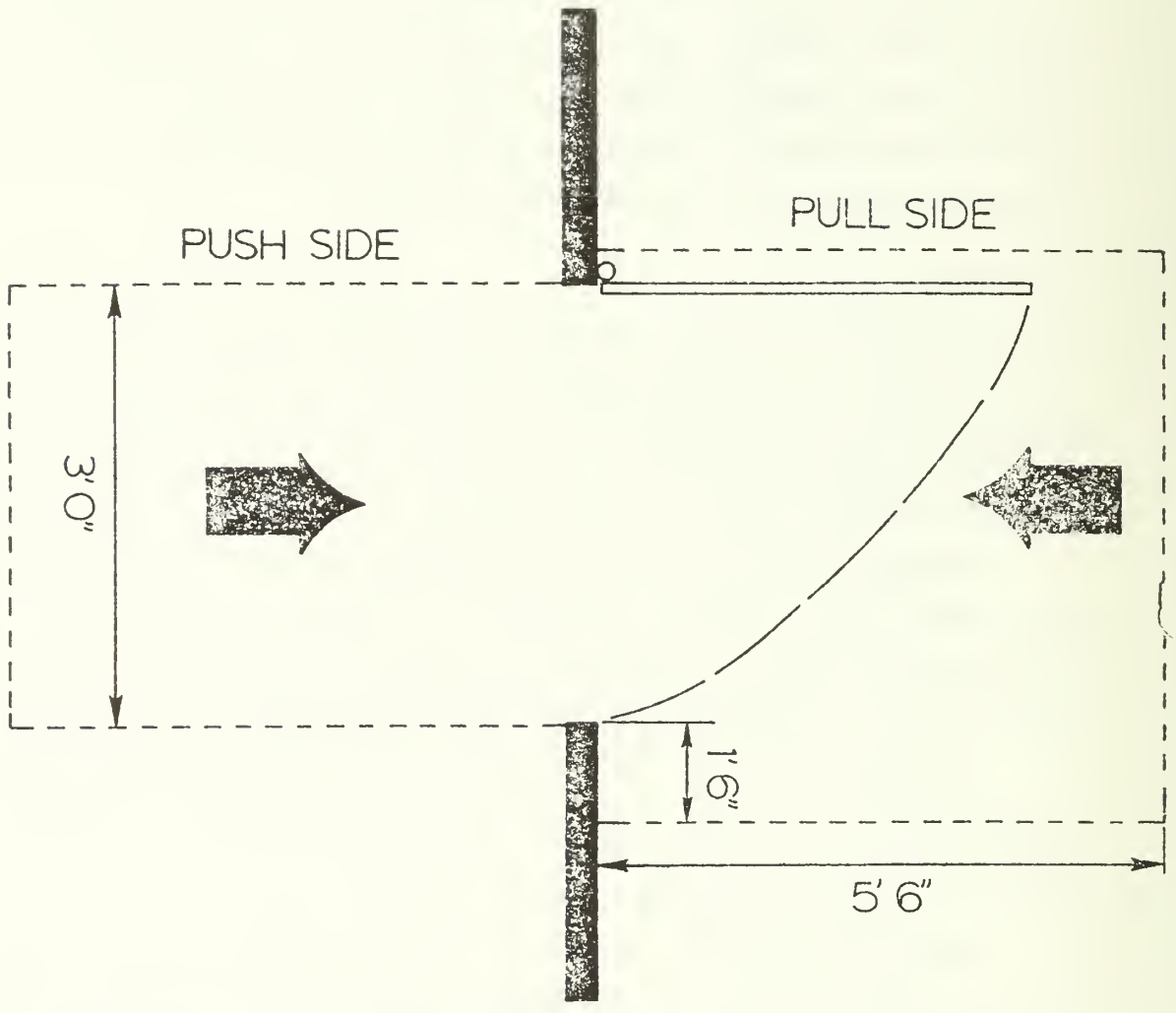


Figure VII-1: Maneuvering space for wheelchairs needs to be provided on both sides of doors.

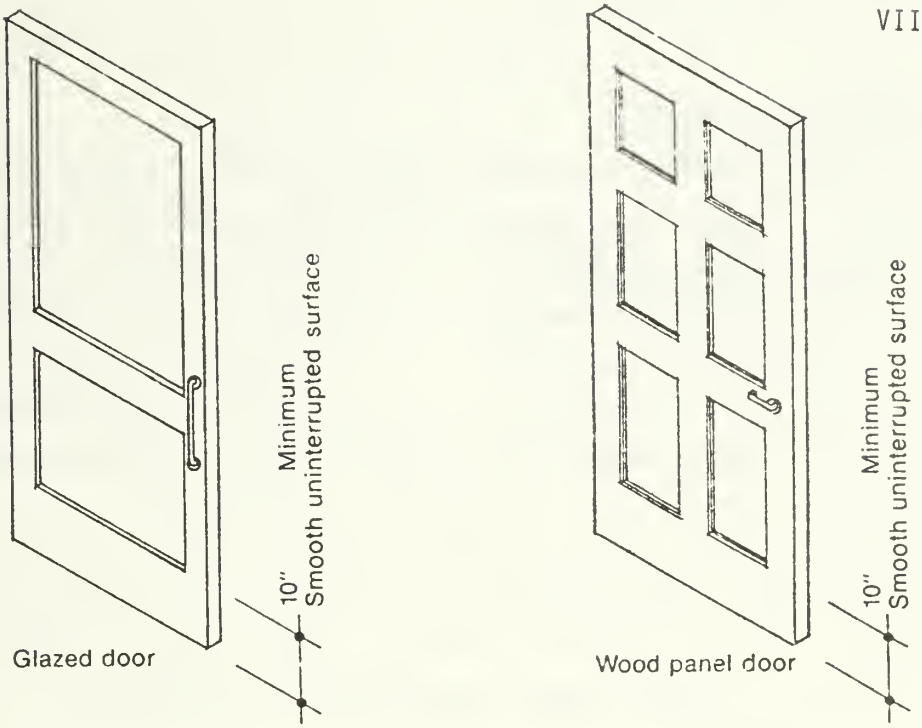


Figure VII-2: Interior doors must have a smooth kickplate at least 10" wide at the bottom of the door.

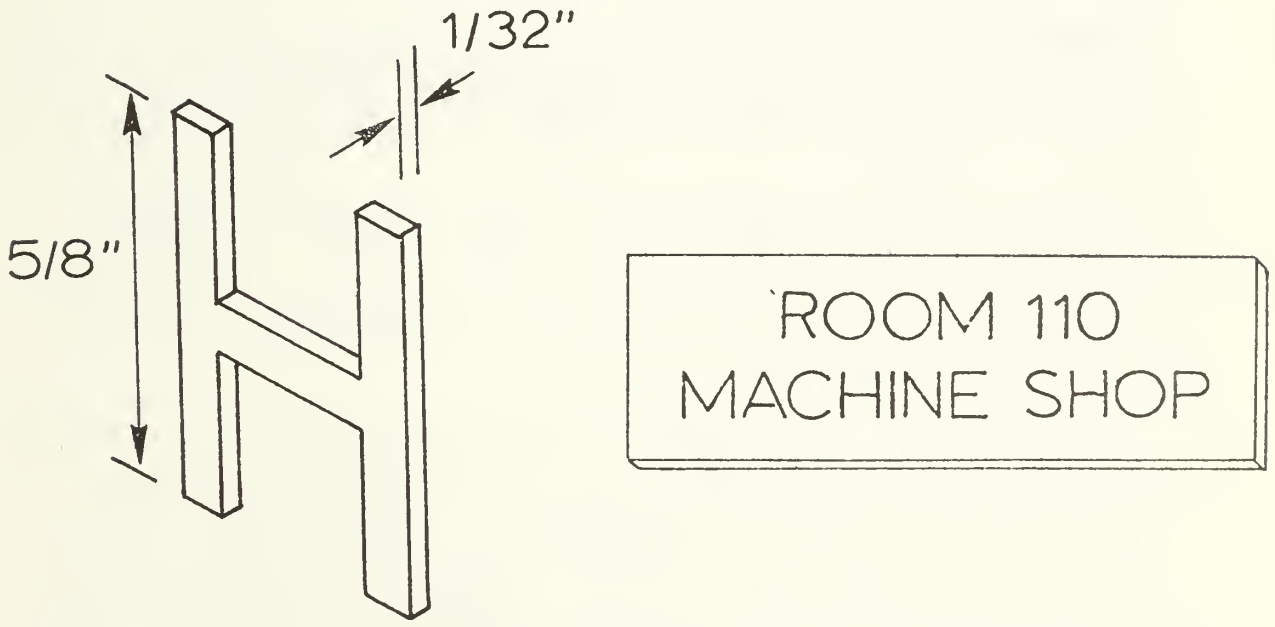


Figure VII-3: Accessible signs will have raised numbers and letters with descriptive wording to help orient the visually impaired student. These signs should be placed on the wall to the latch side of the door at a height readable from a wheelchair.

Circulation in Labs

After entrance is gained, the next concern is vocational laboratory interior circulation. Aisles, work stations, lockers, etc. must be accessible and usable. Of course, any doors and doorways inside the lab which must be negotiated by the physically disabled should conform to the same criteria as entrance doors.

Aisles. After entrance is gained to the lab, the first consideration sould be student movement and flow. Aisles must be wide enough for a wheelchair and the main traffic aisles should be free of protrusions that may be potential hazards for the visually impaired. Such aisles are considered "safe aisles". Safe aisles should be a minimum of 3'0" wide. However, to allow room for a walking student to pass a wheelchair, the aisle should be 4'0" wide. Aisles that are 5'0" wide will allow two wheelchairs to pass.

Aisles in the vocational education lab should be well planned. This will benefit all students, especially the visually impaired. Aisles should lend themselves to safe, smooth traffic flow to lecture and equipment areas in the lab for all students.

Another related concern deals with aisle space around individual pieces of equipment. If the program includes setting up, taking down, and cleaning the piece of equipment, requiring a student to move around the piece of equipment, then be sure to allow at least 3'0" clear space for access on the appropriate sides. However, be aware that to maneuver a wheelchair into position, it generally requires more space than 3'0". The smallest diameter required to turn a complete circle in a wheelchair is slightly over five feet (Figure VII-4).

Work Stations. At least one work station in each lab should be accessible to the physically disabled. The accessible work station should have a clear space of 3'0' wide, 2'0" deep, and 2'6" high beneath a fixed top (Figure VII-5). To make a work station accessible, it may mean raising a table, purchasing an accessible desk or table, making an accessible workbench, etc. (Figure VII-6). Often, modifications can be made with little

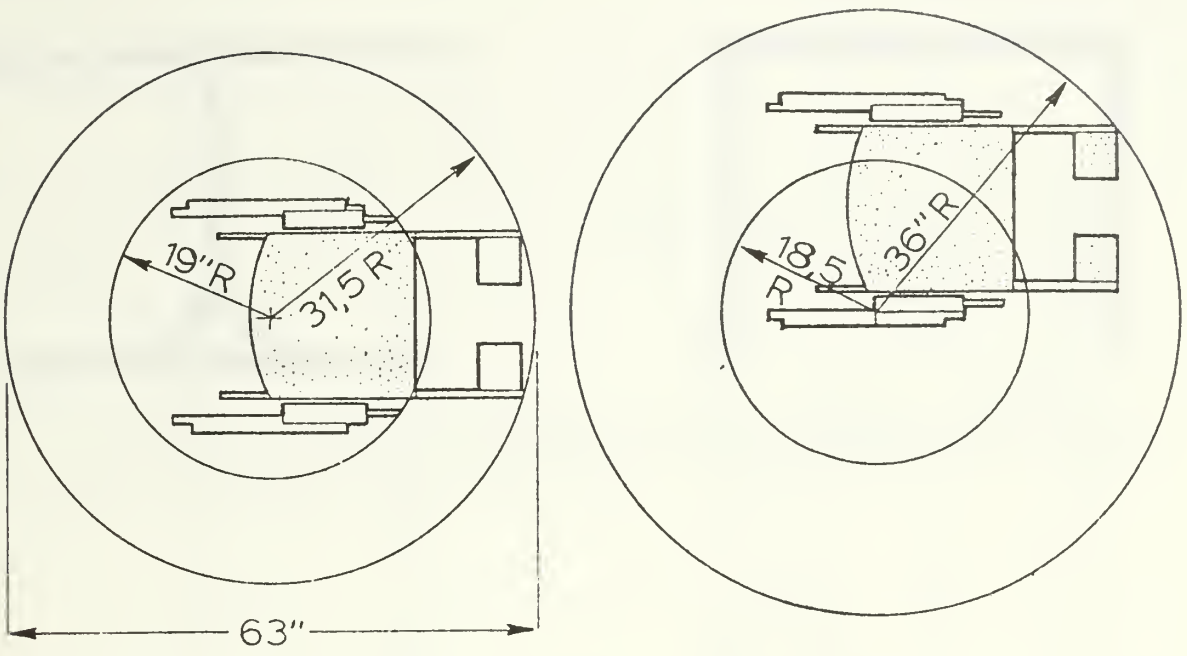


Figure VII-4: Wheelchair turning radii.

expense (Figure VII-7). It may be desirable to have an accessible work table or bench that is adjustable in height.

There are several other ways to construct adjustable work tables and/or benches. For example, table legs can be made out of two pipes, one of which fits inside the other, with a series of holes, and a pin for adjustment (like jack-stands for cars) (Figure VII-8). Possible modifications are really only limited by the ingenuity of the teacher/designer and by the funds available.

Lockers. If lockers and/or other storage places are provided for students, two percent must be accessible to the physically disabled. Accessible lockers should stand between 9" and 48" from the floor, and they must have a clear maneuvering space of 3'6" in front. These specifications must also be met for the location of tool panels and cabinets. Tools and stored items cannot be reached from a wheelchair if they are high off the floor.

Other Considerations. Several other items should be considered for access and safe circulation in a vocational education lab. First, floor surface may increase the possibility of a fall for a visually impaired student or a student with walking disabilities. Also, "good housekeeping" is a must. Material scraps and other items left on floors may obstruct student flow and increase the possibility of falls.

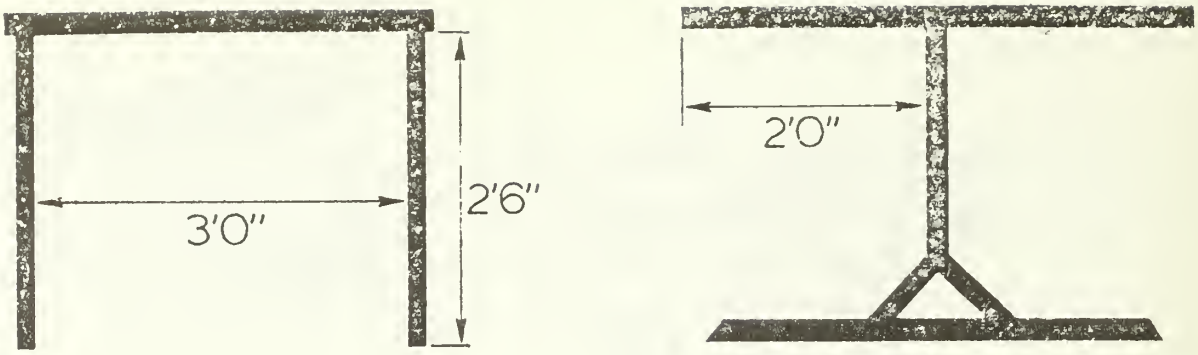


Figure VII-5: An accessible workstation for a student confined to a wheelchair will be 3'0" wide, 2'0" deep, and 2'6" high.

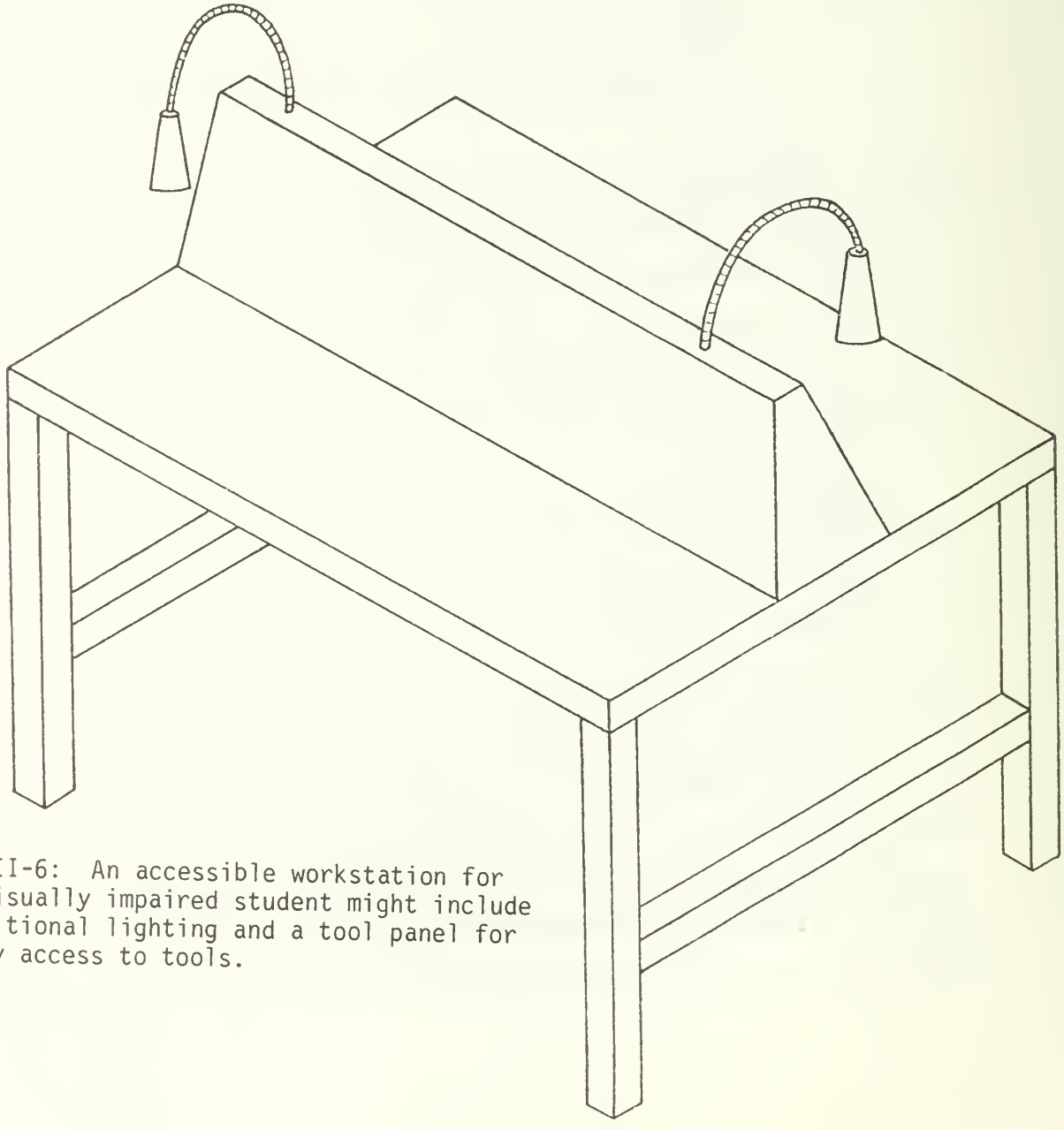


Figure VII-6: An accessible workstation for a visually impaired student might include additional lighting and a tool panel for easy access to tools.

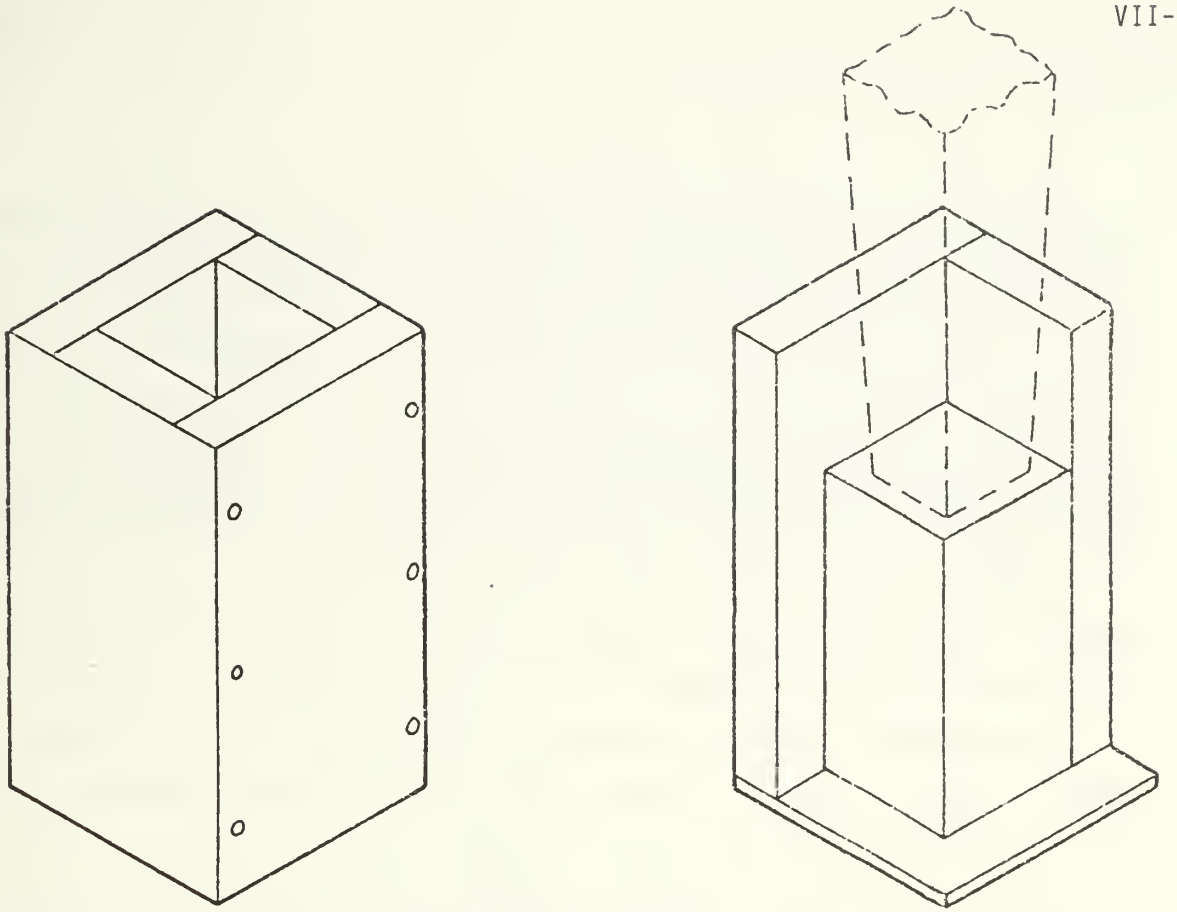


Figure VII-7: Tables can be raised with blocks such as these to allow enough space for wheelchairs.

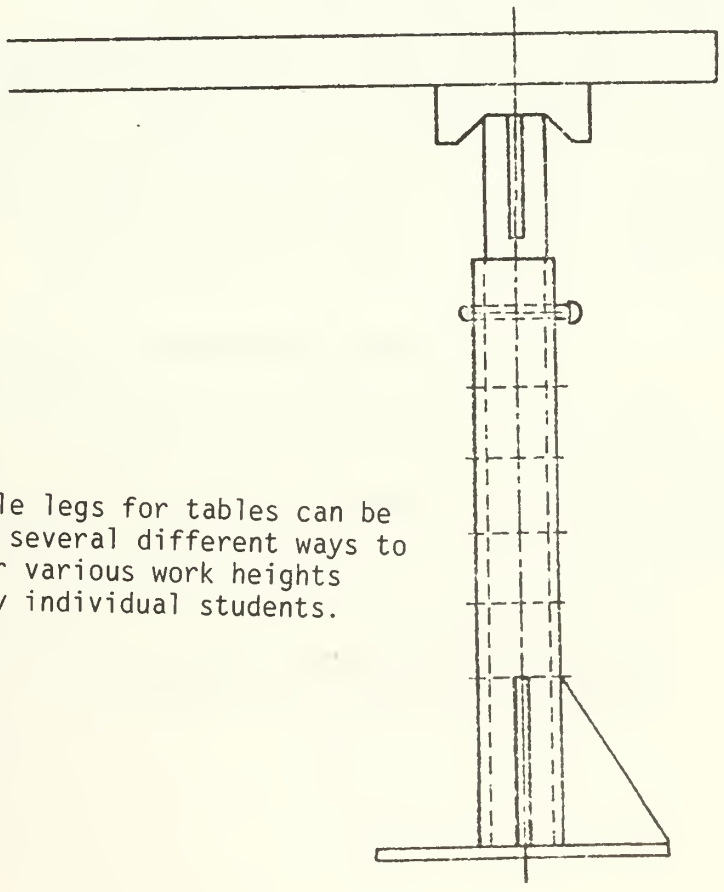


Figure VII-8: Adjustable legs for tables can be designed several different ways to allow for various work heights needed by individual students.

The concept of "good housekeeping" must also be kept in mind when consideration is given to such items as trash receptacles, moveable furniture (i.e., chairs, tables, desks), moveable machinery, and/or tools, rugs and mats, and other items that could be referred to as "moveables". Any and all of these items if left on the floor or work surfaces in the laboratory can become irritating or dangerous for individuals with reduced vision or mobility. Specific locations for moveables should be designated and these items should be maintained in their specified locations.

Lighting and color are important considerations in the lab for all students, especially for the visually impaired. Increased illumination and high contrast colors may breatly assist the partially sighted student.

Alarm systems in the lab and throughout the school should use both sound and sight. Without a visual alarm or warning system, the hearing impaired student may not be aware of dangers.

Doors in the lab which lead to hazardous areas (i.e., chemical storage, electrical control rooms) should be identified in some way. This could be done by knurling or texturing the knob to warn the visually impaired student of a hazard on the other side of the door.

Space and other architectural limitations may make it very difficult to arrange an existing vocational lab to make it accessible. If this is the case, professional consultants may be needed to suggest possible solutions for access. Where total accessibility cannot be achieved, the goal should be to provide as much accessibility as possible.

Laboratory Accessibility Survey

A laboratory evaluation form for accessibility for the handicapped has been developed for assistance in identifying and eliminating barriers in vocational education laboratories. To evaluate your laboratory in terms of handicapped access, the following steps are recommended:

1. Read and become familiar with the requirements presented.
2. Complete the evaluation questionnaire, noting areas and/or conditions that are not in compliance.

3. Compile a list of inaccessible items/areas for further study.
4. Make recommendations to remove and eliminate access barriers.
5. Remove and eliminate access barriers.

This evaluation checklist is designed to be used by the vocational education teacher. Additional resource personnel may be able to assist by making suggestions for solving accessibility problems that are identified by the teacher(s).

LABORATORY EVALUATION FORM FOR ACCESSIBILITY FOR THE HANDICAPPED

NAME OF LABORATORY _____ ROOM NUMBER _____

SCHOOL BUILDING _____ CITY _____

EVALUATOR _____ DATE _____

ITEM	YES	NO	REMARKS
ENTRANCE TO LABORATORY			
1. Do all entry and exit passage doors have a minimum clear opening of 32" in width?			
2. Does the approach on the pull side of the door allow enough room to manuver a wheelchair? (level floor 5' 0" away from the door with at least 1' 6" clear from the jamb on the handle side)			
3. Does the approach on the push side of the door allow enough room to manuver a wheelchair? (level floor 4' 0" away from the door)			
4. Do the entrance doors have a flush, smooth bottom rail at least 10" high?			
5. Are thresholds a maximum of ½" high and are they beveled for wheelchair access?			
6. Are door handles at a reachable height and are they easy to operate?			
7. Are room numbers and descriptive signs installed on the latch side of the door between 4' 6" and 5' 10" from the floor?			
a. Do signs have high color contrast?			
b. Do signs have raised letters or some other tactual means for reading?			

LABORATORY EVALUATION FORM
FOR
ACCESSIBILITY FOR THE HANDICAPPED

ITEM	YES	NO	REMARKS
CIRCULATION IN THE LABORATORY			
1. Aisles			
a. Are aisles between furnishings, equipment, countertops, etc., at least 3' 0" wide?			
b. Are "safe" aisles provided to and from classroom area for the visually impaired?			
c. Is manuvering space provided for wheel-chairs in front of, and around, equipment and work stations?			
2. Work Stations			
a. Is there at least one accessible work station in the laboratory (clear space beneath a fixed top of 3' 0" wide, 2' 0" deep, and 2' 6" high)?			
b. Are provisions made for access to various work stations in laboratories where multiple work stations are utilized during a class session or unit?			
c. Are work stations well lighted?			
3. Lockers, Cabinets, Tool Storage			
a. Are 2% of the lockers not over 4' 0" high from the floor and do they have a 3' 6" manuvering space in front?			
b. Are cabinets that contain tools and/or materials for class activities reachable from a wheelchair?			
c. Are cabinets that contain tools and/or materials for class activities well marked visually and tactually for the hearing and vision impaired?			
d. Are cabinets and other storage areas that contain dangerous materials well marked visually and tactually?			
e. Are the mechanisms for opening cabinets and other storage areas easy to operate?			

LABORATORY EVALUATION FORM
FOR
ACCESSIBILITY FOR THE HANDICAPPED

ITEM	YES	NO	REMARKS
4. Safety and Warning Devices			
a. Are both visual and audible alarms for fire and other emergencies provided?			
b. Are fire alarm activating controls mounted between 3' 4" and 4' 0" above the floor?			
c. Are floors and traffic areas of the laboratory free from material scraps and other materials that might cause falls?			
EQUIPMENT UTILIZATION			
1. Is required laboratory equipment reachable from a wheelchair?			
2. Do controls on required pieces of equipment have tactual markings for visually impaired students?			
3. Are factory options that make equipment and/or furnishings accessible available?			
4. Are adaptive aids/devices available to make equipment usable by the handicapped?			
5. Is there an alternative piece of equipment or an alternative technique that would make course activities accessible?			
6. Do the course/unit objectives need to be modified and/or individualized for individual handicapped students?			

SECTION VIII

ACCESS TO VOCATIONAL EDUCATION EQUIPMENT

ACCESS TO VOCATIONAL EDUCATION EQUIPMENT

Introduction

To successfully complete most vocational education programs, the students will need to develop and utilize some degree of proficiency with various pieces of equipment. This need is the same for both the able-bodied students and the disabled students enrolled in the program.

Some modifications may be required to provide access to the equipment in the vocational education lab to physically disabled students. These modifications may relate either to the lab equipment or to the disabled student. The preference is to have the physically disabled student use regular equipment without modification. Many disabled students, particularly the hearing and vision impaired, can safely use regular equipment given proper instruction. If regular equipment cannot be used safely, consider recent technological advances that make the physically disabled student more mobile and better able to use regular equipment. This type of technology should be considered because it does not alter the equipment that is designed for use by the able-bodied.

If the appropriate "new" technology is not available, then the equipment may need modification. Figure VIII-1 shows the levels of equipment modification for access.

The first level of modification should be a factory option, since factory options to regular equpment will be more readily available for use in employment, and since they do not hinder the able-bodied student. Examples of factory options include a flashing light instead of the return bell on a typewriter designed for the deaf or a light on a band saw to illuminate the cutting surface for the low vision student. If there are no factory options available to make equipment accessible, then two alternatives are suggested. First, the teacher might construct some type of adaptive aid or device to make regular equipment accessible. Examples include some type of jig or fixture to hold the material being worked, or

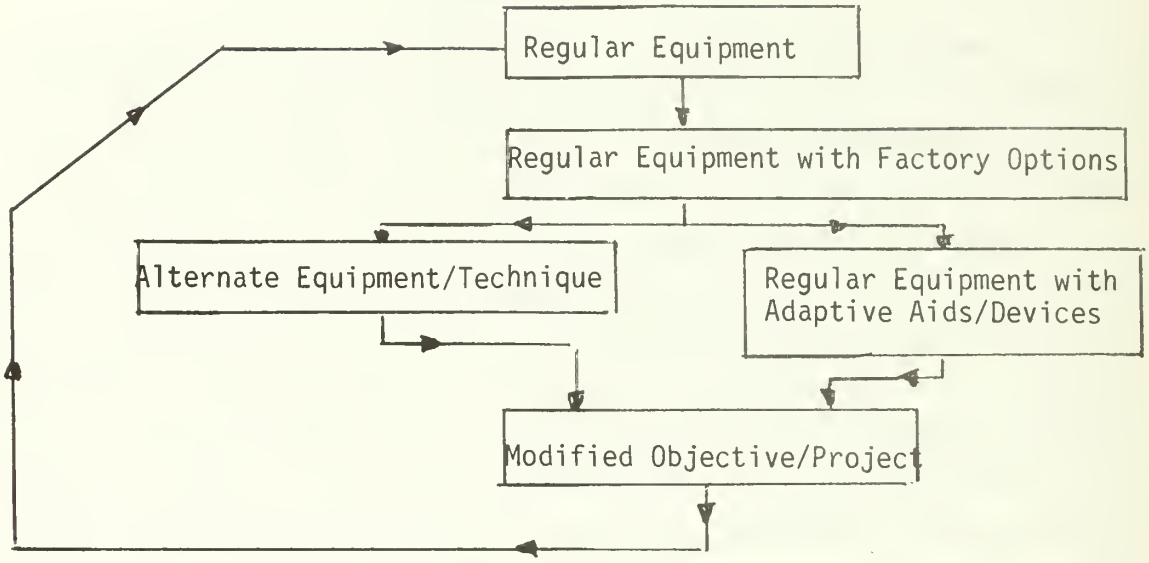


Figure VIII-1
Levels of Equipment Modification for Access

perhaps a ramp and platforms to raise the wheelchair student to a desirable work height.

The second option is to use an alternate piece of equipment, i.e., a smaller version or a different piece of equipment to achieve the same results. For example, a router and router table could be used instead of a shaper or a portable sabre saw instead of a band saw.

If neither of these options can be used to make the equpment accessible, the next step is to review the specific objectives and the reasons for requiring the use of the inaccessible piece of equpment. Perhaps the objective needs to be modified.

Equipment Modification

When it becomes necessary to modify individual pieces of equipment, the best source of information about what is needed may be the handicapped student. Only they can provide information concerning strength and movement limitations.

Because equipment modifications may be made for only a limited number of students, the following factors need to be emphasized:

1. Modifications should be simple in design.
2. Constructed from materials that are available in any locale.
3. Inexpensive.
4. Modifications should not impede the use of the equipment for nonhandicapped students.
5. Should be able to be built in a relatively short period of time in house.

Learning to cope with a physical disability involves learning to function effectively and as normally as possible in the non-disabled world. This must be born in mind when discussing adaptive aids for the physically disabled, since there may be a tendency to overaccommodate these persons. Overaccommodataion or unnecessary emphasis on adaptive aids tends to create an unrealistic environment around disabled persons, which may serve to increase dependence on the adaptive aid rather than increasing self-reliance and personal development. This may in fact limit, rather than improve, the functional ability of physically disabled individuals in the non-disabled world. It must be emphasized, therefore, that only those adaptive aids which are necessary and which emphasize independence and self-reliance are most desirable in a classroom situation.

It must also be re-emphasized that each physically disabled individual is unique in terms of the particular details and characteristics of his or her condition. Each is also unique, therefore, in terms of the adaptive aids and teaching techniques which are appropriate to him or her. Direct consultation with each physically disabled individual is the only way to determine specific accommodations which will be beneficial.

Equipment and tool modification plans are shown in the accompanying Plan Book.

SECTION IX

RESOURCES

RESOURCES

Resources to assist in making buildings, laboratories, and programs accessible to the physically disabled are included in this section. The resources are listed as materials in print, organizations, equipment suppliers, public agencies, and illustrations of accessibility items/modifications.

Materials in Print

Aiello, B. Places and Spaces: Facilities Planning for Handicapped Children. Reston, Virginia: Council for Exceptional Children, 1920 Association Drive, 1976. (ERIC Reference: ED 123 838)

Albright, L., Fabac, J., and Evans, R. A System for the Identification, Assessment and Evaluation of the Special Needs Learner in Vocational Education. Champaign, Illinois: Bureau of Educational Research, College of Education, University of Illinois, 1978 (Available through Curriculum Publications Clearinghouse, 47 Horrabin Hall, Western Illinois University, Macomb, Illinois 61455).

ANSI A117.1 Making Buildings and Facilities Accessible to and Usable by the Physically Handicapped. New York, New York: American National Standards Institute, Inc., 1430 Broadway.

Barrier-Free Site Design. Washington, D.C.: U.S. Department of Housing and Urban Development, Office of Policy Development and Research, 1977. (ERIC Reference: ED 173 984)

Birch, J. W., and Johnstone, B. K. Designing Schools and Schooling for the Handicapped. Springfield, Illinois: Charles C. Thomas, Co., 1975.

Bruwelheide, K. L. Assisting the Physically Handicapped: An Identification and Development of Apparatus for Laboratory Shops, Phase I. Bozeman,

Chasin, J. Home in a Wheelchair: House Design Ideas for Easier Wheelchair Living. Bethesda, Maryland: Paralyzed Veterans of America, 4330 East-West Highway, 1977 ($2.50). (ERIC Reference: ED 150 795)

Foster, J. C. et al. Guidance, Counseling, and Support Services for High School Students with Physical Disabilities. Cambridge, Massachusetts: Technical Education Research Centers, 44 Beattle Street, 1978.

Gugerty, J. J. et al. Tools, Equipment and Machinery Adapted for the Vocational Education and Employment of Handicapped People. Madison, Wisconsin: Vocational Studies Center, University of Wisconsin, 1980.

Jones, M. A. Accessibility Standards Illustrated. Springfield, Illinois: Capital Development Board of the State of Illinois, June 1978, Third Floor, W. G. Stratton Building, 401 South Spring Street, ($3.00). (ERIC Reference: ED 163 738)

Kirkland, S. A. Architectural Barriers to the Physically Disabled. Toronto, Ontario, Canada: Canadian Rehabilitation Council for the Disabled, May, 1973. (ERIC Reference: ED 084 742)

Kliment, S. A. Into the Mainstream: A Syllabus for a Barrier-Free Environment. Washington, D.C.: U.S. Government Printing Office, 1976.

Mace, R. L., and Laslett, B. An Illustrated Handbook of the Handicapped Section of the North Carolina State Building Code. Raleigh, North Carolina: North Carolina Department of Insurance, 1974.

Maloney, P., and Weisberger, R. Mainstreaming the Handicapped in Vocational Education: Serving the Communication Impaired. Palo Alto, California: 1977. (ERIC Reference: ED 142 749)

Meers, G. P. Handbook of Special Vocational Needs Education. Rockville, Maryland: Aspen Systems, 1980.

Mobile Homes--Alternative Housing for the Handicapped. Washington, D.C.: U.S. Department of Housing and Urban Development, Office of Policy Development and REsearch, 1977.

Mullins, J. B. A Teacher's Guide to Management of Physically Handicapped Students. Springfield, Illinois: Charles C. Thomas, Co., 1979.

Physically Handicapped--Adaptive Aids and Equipment/Communication Systems/ Architectural Design: A Selected Bibliography. Reston, Virginia: Council for Exceptional Children, Exceptional Child Bibliography Series Number 655.

Schwartz, S. E. Architectural Considerations for a Barrier-Free Environment. Gainesville, Florida: College of Education, University of Florida, 1977. (ERIC Reference: ED 153 048)

Steinfeld, E. Barrier-Free Access to the Man-Made Environment--A Review Of Current Literature. Syracuse, New York: Syracuse University School of Architecture, October, 1975. (ERIC Reference: ED 123 855)

Tica, P. L., and Shaw, J. A. Barrier-Free Design: Accessibility for the Handicapped. New York, New York: Institute for Research and Development in Occupational Education, The Graduate School and University Center, City University of New York, September, 1974. (ERIC Reference: ED 108 452)

Tindall, L. W. et al. Puzzled about Educating Special Needs Students? A Handbook for Modifying Vocational Curricula for Handicapped Students. Madison, Wisconsin: Wisconsin Vocational Studies Center, University of Wisconsin, 1980.

Trotter, C. E. Planning Facilities for Physically Handicapped Children: Fifth Annual Conference. Knoxville, Tennessee: The School Planning Laboratory, University of Tennessee, 1974. (ERIC Reference: ED 102 763)

Turnbull, A. P., and Schulz, J. B. Mainstreaming Handicapped Students: A Guide for the Classroom Teacher. Boston: Allyn & Bacon, 1979.

Wachter, P., Lorence, J., and Lai, E. Urban Wheelchair Use--A Human Factors Analysis. Chicago: Access Chicago, Rehabilitation Institute OF Chicago, 345 East Superior Street, 1976.

Yater, V. V. Mainstreaming of Children with a Hearing Loss. Springfield, Illinois: Charles C. Thomas, Co., 1977.

Organizations

Alexander Graham Bell Association for the Deaf, Inc.
3417 Volta Place, N.W.
Washington, D.C. 20007
(202)337-5220

American Council of the Blind, Inc.
501 North Douglas Avenue
Oklahoma City IO 73106
(405) 232-4644

American Diabetes Association, Inc.
1 West 48th Street
New York, NY 10020

American Foundation for the Blind
15 West 16th Street
New York, NY 10011
(212) 924-0420

American Printing House for the Blind
P.O. Box 6085
1839 Frankfort Avenue
Louisville, KY 40206
(502) 895-2405

Architectural and Transportation Barriers Compliance Board
Mary E. Switzer Building, Room 1010
330 C Street, S.W.
Washington, D.C. 20201
Public Information Office (202) 245-1591

Association for Education of the Visually Handicapped
919 Walnut Street
Philadelphia, PA 19107
(215) 923-7555

Council for Exceptional Children
1920 Association Drive
Reston, VA 22091
(703) 620-3660 (800) 336-3728

Epilepsy Foundation of America
1828 L Street, N.W. Suite 406
Washington, D.C. 20036
Advocacy and Client Referral (202) 293-2930

Materials Development Center
Stout Vocational Rehabilitation Institute
Menomonie, WI 54751
MDC Information Service (715) 232-1342

Muscular Dystrophy Association, In.
810 7th Avenue
New York, NY 10019
Director of Patient and Community Services
(212) 586-0808

National Amputation Foundation, Inc.
12-45 150th Street
Whitestone, NY 11357
Executive Secretary (202) 767-0596

National Association for Visually Handicapped
305 East 24th Street, 17-C
New York, Ny
(212) 889-3141

National Association of the Deaf
814 Thayer Avenue
Silver Springs, MD 20910
Public Information Officer (302) 587-1788

National Association of the Physically Handicapped, Inc.
76 Elm Street
London, OH 43140

National Center for a Barrier Free Environment
8401 Connecticut Avenue, N.W.
Washington, D.C. 20015
(703) 620-2731

National Center for Law and the Handicapped, Inc.
1235 North Eddy Street
South Bend, IN 46617
(219) 288-4751

National Center, Educational Media and Materials for the Handicapped (NCEMMH)
Ohio State University
Columbus, OH 43210
(614) 422-7596

National Easter Seal Society for Crippled Children and Adults
2033 West Ogden Avenue
Chicago, IL 60612
Infomation Center (312) 243-8400

National Federation of the Blind
218 Randolph Hotel Building
Des Moines, IA 50309
(515) 243-3169

National Foundation--March of Dimes
1275 Mamaroneck Avenue
White Plains, NY 10605
(914) 428-7100

National Institute for Rehabilitation Engineering
97 Decker Road
Butler, NJ 07405
Technical Director (201) 838-2500

National Multiple Sclerosis Society
205 East 42nd Street
New York, NY 10017
(212) 532-3060

National Paraplegia Foundation
333 North Michigan Avenue
Chicago, IL 60601
(312) 346-4779

National Society for the Prevention of Blindness, Inc.
79 Madison Avenue
New York, NY 10016
Information and Referral Specialist
(212) 684-3505

President's Committee on Employemnt of the Handicapped
Washington, D.C. 20210
Office of Information
(202) 653-5010

Recording for the Blind, Inc.
215 East 58th Street
New York, NY 10022
Circulation Department (212) 751-0860

St. Paul Technical Vocational Institute
235 Marshall Avenue
St. Paul, MN 55102
Program for Deaf Students
(612) 227-9121

Spina Bifida Association of America
343 South Dearborn, Suite 319
Chicago, IL 60614
Information and Referral Department
(312) 663-1562

United Cerebral Palsy Associations, Inc.
66 East 34th Street
New York, NY 10016
Director of Program Services
(212) 481-6350

Equipment Suppliers

American Foundation for the Blind
15 West 16th Street
New York, NY 10011
(212) 924-0420

Fred Samons, Inc.
P.O. Box 32
Brookfield, IL 60513

R. J. Mobility Systems and Conversion Specialists
715 South 5th Avenue
Maywood, IL 60153
(312) 344-2705
--Distributor for:
Levo Standup Wheelchair
Mainstreaming Elevating Wheelchair

Telesensory Systems, Inc.
3408 Hillview Avenue
Palo Alto, CA 94304
(415) 493-2626
--Dave Witter, Midwest Representative
1624 Timber Trail
Wheaton, IL 60187

Typewriting Institute for the Handicapped
3102 West Augusta Avenue
Phoenix, AZ 95021

Illinois Bell Telephone
Communications Center for the Disabled
225 West Randolph Street
Chicago, IL 60606

Montana State Services

For information on selected resources and resource agencies available in Montana, contact the following office in the Office of the Superintendent of Public Instruction, Helena.

a. Special Needs Consultant--Vocational Education.

b. Assistant Superintendent for Special Services.

c. Consultant for Special Education.

APPENDIX

Check List #1

Student Information Sheet

The following is confidential information--to be used for educational planning purposes only.

Student's Name: _____

Date of Birth: _____ Age: _____

Parents'/Guardians' Names: _____

_____

Category of Handicap: _____

_____

Current Grade Level: _____

Specific Characteristics:

Type of Educational Program Developed:

Check List #2

School District Staff Contributing to Education of the Handicapped

Personnel	Individual is present in district and involved in I.E.P. process or services are otherwise provided--Yes or No?
A. Regular Teachers	
B. Resource Teachers	
C. Itinerant Teachers	
D. Self-Contained Class Teacher	
E. Special Education Consultants	
F. Director of Special Education	
G. Principals	
H. Counselors	
I. School Psychologists	
J. Librarians	
K. Therapists	
L. Paraprofessionals	
M. Students	
N. Parents	
O. Community Volunteers	

Check List #3

Major Components of the Individualized Education Program (I.E.P.)

Student's Name: _____ Date: _____

School: _____

The following I.E.P. activities need to be completed for the total planning process:

Activity	Completed		
	Yes	No	In-Process
A. Statement indicating student's present levels of educational performance.			
B. Statement of annual goals.			
C. Short-term instructional goals.			
D. Specific educational services to be provided.			
E. Extent to which the student will participate in the regular educational program.			
F. The dates for initiation and projected duration of services.			
G. Objective criteria, procedure, and schedules for evaluating the extent to which short-term instructional objectives are met.			

Check List #4

I.E.P. Activities Progress Report

Student's Name: _____ Date: _____

School: _____

	COMPLETED (DATE)	IN-PROCESS	NOT DONE
A. Referral of student to special education program for special services. Personnel: Special Education director, district administrator, parents.			
B. Development of the Student Mainstreaming Team. Personnel: Administrators, Special Education personnel, parents, classroom teachers, support specialists.			
C. Assessment of handicapping condition and level of educational progress. Personnel: Assessment specialists, Special Education teachers, parents, psychological/medical support personnel.			
D. Review of student abilities and limitations coordinated with available school resources. Development of academic and supportive services program. Setting of long and short range educational goals and instructional objectives. Personnel: Parents, Special Education administrators and teachers, regular teachers, evaluative personnel.			
E. Student placement and instruction program delivery. Personnel: Resource room teacher, regular classroom teacher, special services personnel.			
F. Periodic student evaluation; achievement of goals and objectives. Personnel: Classroom teacher, resource room teacher, parents, Special Education director.			
G. Continual instructional delivery.			
H. End-of-term evaluation--completed to determine if instructional goals/objectives have been attained. Personnel: Resource room teacher, regular classroom teacher, parents, support services personnel, Special Education administration.			
I. Formulation of continuing I.E.P., plus base line evaluation of past levels of performance. All personnel.			